CHEMICAL INDUSTRIES

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After N. R. A.—

CHEMICAL industry is thankful for the check to the costly and un-American N. R. A. experiment; but what appears to most of us an obvious, necessary return to sanity must not fool us into imagining that the sincere ideals inspiring this deluded effort are destroyed by decisions of the Supreme Court. The smarting blows administered the President's pride may well account for his stubborn advocacy of his discredited alphabetical program. His more politically minded followers will work manfully to salvage any scraps of their shredded prestige. About a hundred thousand New Deal employes—many entrenched in influential bureaucratic posts—will fight for their jobs. Powerful as these influences are, others more powerful are at work to continue experiments with the traditional American system.

Throughout the world, a new conception of the fundamental purpose of any economic system has been slowly growing, and today we witness a score of experiments seeking how that new purpose may be accomplished. The common characteristic of these experiments is a substitution of individualism for private profit by some form of collectivism for the common good. Private capitalism is challenged and merely to point to the tremendous raise in the standard of living accomplished during the past century or to prophesy the disastrous collapse of any socialized industrialism will not stop the political wrecking of the present economic system. The real threat is that collectivism makes the welfare of the masses, not the by-product, but the sole aim of all economic activity. We can answer only by proving in capitalism a sense of public responsibility at once economic and social.

Chemical industry, so we all believe, is destined to lead the next economic era. Our obligation therefore is heavy, and we may be proud of our demonstrated ability to shoulder both the economic and the social responsibilities of the new leadership. Our practical industrial creed has long been "better and better chemicals cheaper and cheaper". No other industry equals our records for this kind of contribution to the more abundant life. In 1932 we paid more dollars to chemical workmen for fewer hours than the ideal wage-hour scale which N. R. A. proposed to the manufacturers of the country. If we are to have the leadership, we cannot escape the responsibility it involves. We must continue to set the example of the modern mass production tenet of profits through high wages and low prices. We must not fail to make the greatest possible contribution to the common welfare by passing along promptly lower costs and improved products, the results of our great technological progress.

Shoemaker Stick to Your Last

Advocacy of a scientific bloc in American politics by the American Chemical Society can only be founded upon a misconception of the talents of scientists and of the services which science renders to the modern world. The proposal appears, however, to be worse than futile. No encouragement should be given the formation of any more little blocs of economically interested groups, since there has been no recent tendency in American politics which has worked, and is working, more effectively against the best interests of the American people as a whole than these same organized minorities. The complaint that the voice of science is not heard does not so much impress us as it rouses our curiosity as to what that voice might contribute to the swelling cause of political self-interest. The sole practical implication to be drawn from this proposal is that the American Chemical Society is sponsoring a chemists' union; a proposal which the chemists themselves have more than once vetoed.

Corn, Cotton and Chemicals

Any prospect to make chemical use of any agricultural waste or surplus is pleasing. It is good chemistry to use the complex molecules Nature can build up more cheaply than we, just as it is good economics to employ profitably our excess farm products. Nevertheless, such proposals all raise fundamental questions of chemical economics, so let us consider the broader implications of any industrial use of any agricultural material.

Immediately we recognize that this project runs counter to the trend of recent chemical development. Fifty examples of synthetics that successfully replace natural products come to mind. More than this, the economic theories currently popular in Washington are forcing natural materials further out of industrial operations. Any artificial restriction of production or pegging of price makes the use of agricultural products more difficult, and these positively encourage the manufacture of synthetic substitutes from inorganic raw materials.

Foreign production of cotton is stimulated by the 12c price which the Government is maintaining, but it is quite as significant that du Pont, Hercules, and Cyanamid have forsaken linters and are producing nitrocellulose from pulp. Because of their greater detergent powers, the higher fatty alcohols increasingly cut down, as compared with soap, the consumption of vegetable oils. Over three million gallons of isopropyl alcohol from petroleum are successfully competing with alcohol from molasses, and in considering alcohol, we should not ignore the open secret that Carbide's synthetic alcohol has a lower plant cost than distilled alcohol.

Those who are sincerely endeavoring to assist agriculture and encourage the chemical industry would be well advised to tell all farmers frankly that there can be no industrial market for their products unless they reject resolutely all plough-under policies and follow wholeheartedly the Biblical admonition "to make two blades grow where but one grew before." To hope that by law an artificial market can be created is a delusion. To rely upon a political solution of chemical problems is to forget that the three big industrial uses of farm materials —alcohol, corn-starch, and Celotex—are all strictly commercial developments.

Monthly Price Revisions

E. M. Allen's suggestion to the purchasing agents, assembled in convention last month, of a contract calling for monthly price adjustments to provide for possible inflation of a more serious character than anything heretofore experienced, is food for thought. Certainly there are arguments pro and con, and opinions in the trade vary widely.

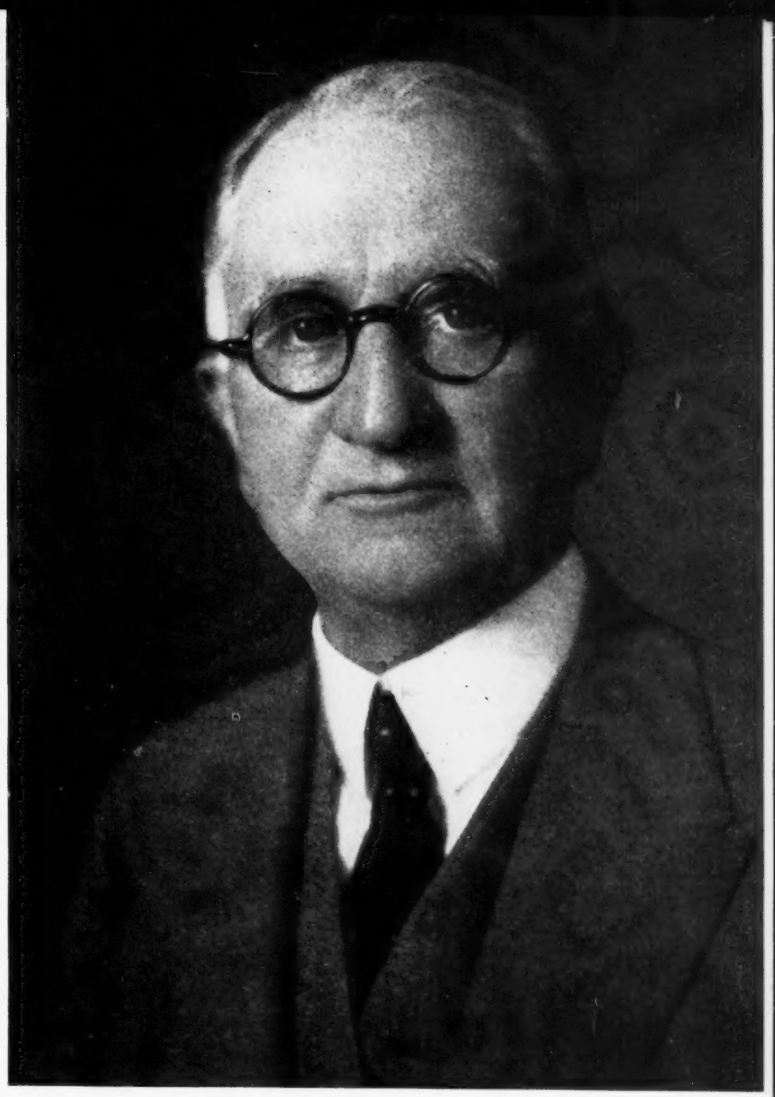
Chemicals have been sold during the last two years on a contract calling for either a semi-annual or a quarterly adjustment. So far it has not been found necessary to make use of this clause. Whether, in practical operation, sales contracts could be reduced to monthly adjustments is a matter on which there will be much disagreement. Would spot purchasing be more desirable?

Closures For Fine Chemicals

There is little doubt but what the plastics industry overestimated its market possibilities in some directions and under-estimated them in others. This is perfectly natural in the development of any new industry. If the plastics industry has not all but put the glass and chinaware makers out of business, as some over-zealous partisans originally claimed it would do, it has found a very definite place, and it would be difficult to imagine many industrial fields getting along now without the many varieties of plastics to draw upon because of their utilitarian and decorative contributions. Within the past few months two of the leading producers of fine chemicals have turned to plastic caps for their bottles.

The Industrial Explorer of Brine

Herbert H. Dow



DURING the winter term of 1887-88 one of the six seniors at the Case School of Applied Science went to work to prepare his thesis on "The Chemical Uses of Fuel in Boilers." Nobody—least of all, the rather serious-minded young man himself—guessed that he had set forth on a path that was to lead straight to the presidency of a vast corporation with 250 acres of great plants all built upon his skill as a chemical engineer and his ability as an executive.

He was a quiet, but friendly youth. At a bigger college his husky, rangy frame would have delighted the eye of some discriminating football coach. In the small, hard-working classes of Case of the early days, his alert, curious, retentive brain could not but impress his teachers. They recognized a promising student with independence and courage, honesty and determination to support his exceptional mental powers. Within a few years these same teachers were to have the opportunity to substantiate their early recognition of Herbert H. Dow's capabilities and character. Several of them were among his earliest financial backers.

In preparing his thesis young Dow undertook a conscientious study of the chemical composition of fuels. While collecting a sample of natural gas near Cleveland, the driller called his attention to the exceptionally bitter taste of the brine from the same well. This raised questions outside the scope of his fuel inquiries, which most young chemists would have ignored; but his alert curiosity was aroused and with characteristic energy he set out to find why that brine tasted so bitter. Analysis revealed an exceptionally high lithium and bromine content.

At this point another of Dr. Dow's characteristics early displayed its force. He knew that oil was selling at a dollar a barrel, and he quickly figured that there was about three dollars worth of lithium in a barrel of the brine. His commercial instinct, always keen and always stimulated by his chemical investigations, told him that that particular well was more valuable for its lithium than its petroleum; but his commercial instinct was sound and he recognized, at the same time, that the bromine content of this brine was even more important industrially than the higher priced, but less demanded, lithium.

Writing of these studies many years later he said: "I also did some development work on extracting the bromine from this sample of brine, and found that the bromine content was higher than in the brines of the wells in the Ohio River district, where bromine was being manufactured commercially."

Here lies the germ of the idea that grew into the Dow Chemical Company. For these investigations, carried along while he was preparing his thesis on fuel, prompted a further study of lithium and bromine in natural brines, which took him to Pennsylvania, Ohio, West Virginia, and finally to Michigan. From samples collected on these trips he learned that lithium was present in greatest quantity in the Ohio brines, but quite absent from the Michigan brines; and most important of all, he discovered a maximum of bromine in brines from Canton, Ohio, and Midland, Michigan.

Continuing his account, Dr. Dow wrote: " In the fall of 1888 I accepted a position as professor of chemistry and toxicology in a medical college in Cleveland, where I had a laboratory and an assistant, and I utilized all my spare time in perfecting a process for extracting bromine from brine. This process offered better com-

mercial possibilities than the only process I had been able to devise for lithium."

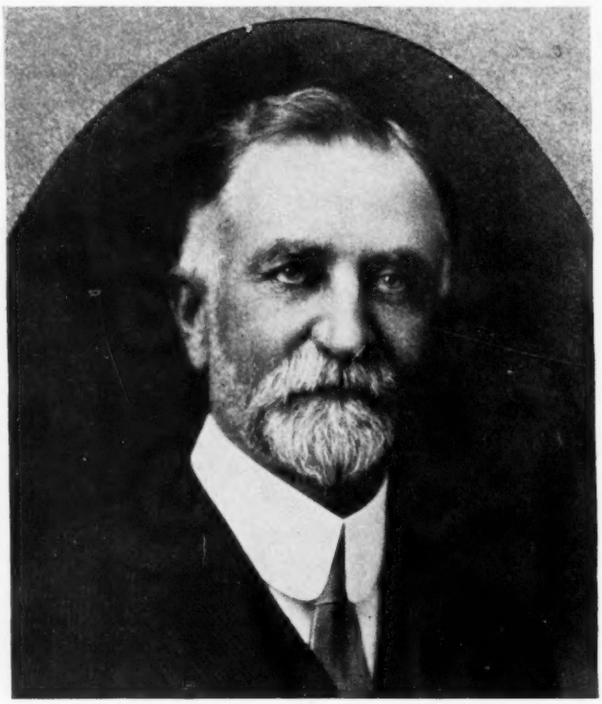
He is now fairly embarked on his great life work, and in the spring of 1889, having interested some local capitalists, he started a small bromine extraction plant at Canton, Ohio. Chiefly because these Canton capitalists were impatient, this venture was a commercial failure. However, the operation convinced Dr. Dow that the extraction of bromine by oxidation without evaporating the brine was chemically practical. He saw in the over-production of salt and the passing of the boom lumbering operations, with their low-cost fuel of scrap and sawdust, the opportunity for his process to replace economically the old evaporation plants that willy-nilly produced both salt and bromine. Accordingly, he returned to Cleveland, and after working out some refinements in his process, entered into partnership with J. H. Osborn of the National Carbon Company, Cleveland. They leased a brine well, situated square in the middle of Main Street, Midland; and in the fall of 1890 a tiny plant, with a crew of three men, one of whom was Herbert Dow himself, began operating twenty-four hours a day.

Midland was, at the time, the largest producer of bromine in the United States, and but a few months proved that unless the operation might be conducted on a larger, more economical scale, the little new plant could not compete with its established rivals. Accordingly, two more partners were taken into the Midland Chemical Company. Within the year it was determined again to expand. The partnership was turned into a corporation with $100,000 capital stock, and the effort was made to raise $27,500 in cash. Only $10,000 worth of stock was sold; but young Dow evidently lost financial control of the enterprise and seemed destined for the fate of so many inventors since at the organization meeting held in Midland on August 17, 1892, W. B. Remington was elected president; Thomas Percy and J. H. Osborn, vice presidents; W. W. Cooper, secretary, and B. E. Helman, treasurer. H. H. Dow was engaged as superintendent and the business affairs placed in the hands of the new treasurer, Mr. Helman.

But the young superintendent continued his chemical investigations. In the first step of his own process he replaced bleaching powder with chlorine as the oxidizing agent, and a year later he erected the first electrolytic chlorine plant in America right beside the fine new bromine plant. The current had been turned on but an hour when a tremendous explosion wrecked the new building and seriously damaged the bromine plant.

The directors, all of whom lived in Cleveland, were summoned post-haste to Midland to attend a special meeting, almost an indignation meeting. The inventive superintendent was instructed in no uncertain terms to produce bromine and to cease forthwith his silly and costly experiments; and the official records of the Midland Chemical Company record the verdict of no more expansions, a decision that was literally carried out, so that for several years all earnings were paid out in dividends.

Although even a minority stockholder's share of those dividends was sufficient to satisfy most ambitious young chemists, nevertheless dollars did not drive new chemical ideas out of Herbert Dow's head, and no power on earth could have kept him from testing out those ideas. As a student in college he had said: "I would rather



Herbert H. Dow at the time his chemical projects were coming into his own and he was well established at Midland.

make $3,000 a year on my own than earn $10,000 a year working under the direction of someone else." It was not a boast, but a principle; and so, in 1895, he is back in Cleveland again with a proposal to exploit further the chemical possibilities of brine by manufacturing electrolytic chlorine and its derivatives. This persistent pursuit of chlorine by electrolysis, even after the disastrous explosion, reveals another dominant trait in Dr. Dow's character. Once convinced of the soundness of a chemical idea, neither time, nor effort, nor cost counted with him as against ultimate success. Many years later he persistently ploughed through great snowdrifts of discouragements to the commercial production of magnesium metal and the commercial marketing of light alloys.

In forming the Dow Process Company to exploit electrolytic chlorine, Dr. Dow was most fortunate in his associates. Among them were his original partner, J. H. Osborn; his classmate, James T. Pardee; and two of his teachers at Case, Cady Staley, the president, and Albert W. Smith, a professor of chemistry. Out of this partnership grew the Dow Chemical Company. For after running an experimental plant at Navarre, near Canton, Ohio, about a year, this electrolytic operation was moved back to Midland. Shortly thereafter the Dow Chemical Company was incorporated.

Financial resources were strengthened by the sale of

stock, and at the time of the election of the Board of Directors, May 18, 1897, there were fifty-seven shareholders of record. On that first board, in addition to Dr. Dow, his classmate, James T. Pardee, and his old teachers, President Staley and Professor Smith, were A. E. Convers, a manufacturer of tacks who upon Dr. Dow's death became Chairman of the Board; two bankers, Charles A. Post of Cleveland, and William L. Baker of Midland; two important manufacturers, S. T. Wellman (steel) and G. E. Collings (woolen goods). Most of these men were, for many years, closely identified with Dr. Dow's struggles and triumphs, and at the time of his death, thirty-five years later, three of them were still active in the Company's affairs.

Three years later the Dow Chemical Company took over the plant and bromine processes of the Midland Chemical Company, and in 1902 a new subsidiary company was formed, under the old Midland name, to manufacture chloroform by a process originally worked out by A. W. Smith and William O. Quale. Until 1914, when it was purchased by the parent organization, this company remained a separate corporate entity.

With the introduction of the chloroform operation, Herbert Dow launched forth boldly upon the career that began with his student-day analysis of natural brines and ended with the commercial production of over two hundred and fifty chemical products drawn fundamentally from Midland brine. Beneath the story of the technical and industrial exploitation of brine lay the manufacturing and merchandising philosophy of this great chemical industrialist.

One beautiful spring afternoon, six months after the close of the World War, sitting in his beloved garden, Herbert Dow expounded this philosophy of his to me. It was a warm, sunny day and thousands of young apple trees, all pink and white with bloom, stretched away in long, flowing rows from the little hillock where we sat in comfortable rustic chairs. The morning had been spent inspecting the plant, then in the throes of vigorous readjustment from a war to a peace basis. Some operating departments were cold and silent; others were undergoing obvious re-vamping; still others were orderly, running at capacity. Dr. Dow showed everything and explained everything—why, for example, the chlorbenzol operation was "down" and wherefore he was planning a new phenol research. Plainly he had made the important decisions of policy and was already working out definitely his plans for the new era in American chemical manufacturing. His conclusions reached, his program drawn up, he was in that comfortable frame of mind that confidence in the future and in himself assured; and he was prompted by the peace and beauty of the scene before us to speak most frankly. During lunch we had been talking about chemical price quotations, and I had been enlisting his support of a movement openly to publish contract prices in the trade press. As we sat there in the garden he came back to this subject.

"Price policies and programs of production seem to me the two fundamentals of chemical manufacturing about which we cannot do too much thinking. Both should be carefully planned. When they are allowed to become haphazard, they cause a great deal of trouble both for the individual company and the industry as a whole. Because we can make a certain chemical is no reason at all why we should do so. Because a competitor fixes a certain price, be it high or low, is no reason why we should meet it.

"We stand at the beginning of a great period of chemical expansion. If we, the chemical industry, are to make the most of this opportunity, it is necessary for us to make chemicals of higher and higher grades, more uniform and more dependable, at lower and lower prices. Only in this way can our products become the

The office force in the early days. In the first row, left to right, are: F. N. Lowry, E. W. Bennett, E. O. Cross, Fred Vance, G. Lee Camp; and in the back row, left to right, are: Jim Smith, E. O. Barstow, J. E. LeFevre, and J. C. Graves.

chemical tools for other industries. These are the plain facts of the situation. We must make our plans and policies square with those facts.

"Here at Midland our job is to make chemicals out of our brine. I want to see us extract every possible chemical opportunity out of that brine, and I will not be satisfied until we do not buy a single outside raw material, except," he added, with a smile that wrinkled up his friendly blue eyes, "say, a little C. P. sulfuric acid for laboratory work. But I am not at all interested in making anything, except to salvage a by-product or a waste, that we cannot make cheaper and better than anyone else is now making it. When we do make it better, I want to sell it as cheap as anyone. When we make it cheaper, I want to pass that advantage on to the consumer at once."

A photograph of the Dow Chemical plant taken August 31, 1900. At the rear, to the left, is the lime house; and to the right, the power house, in front of which is the warehouse.

That philosophy, translated into action, is the story of the Dow Chemical Company. The development of the Dow Process for making phenol from chlorbenzol rather than by the sulfonation of benzol is a neat example of the principles and the practice. Dr. Dow early sensed that the plastics industry would be a growing market for phenol, that the cost of this item was an important factor in the price of finished plastics, and that lower prices would open up new fields for these then-new synthetic materials.

Having operated the sulfonation process during the War he also knew that the determining element in the cost of phenol at Midland was the price of sulfuric acid. The chlorbenzol operation was within the scope of his program to develop to the uttermost his own raw material resources. In spite of the knowledge that the Bakelite Corporation, the largest consumer, was building its own phenol plant, he went ahead with this development work, because he was confident that the costs of his new process would be lower. When the Dow phenol operation came into production in 1925 the price dropped from 36¢ to 21¢, and Bakelite, while holding their new plant in reserve, contracted with Dow for their requirements at a price substantially the same as their own making cost. Furthermore, in 1929, when the original phenol-formaldehyde patents expired and new plastic makers greatly increased the demand, Dow, instead of raising the price, deliberately lowered it to 11¢.

The chemical exploitation of brine, which began with ferric bromide (the first commercial product of the old Midland Chemical Company), proceeded quickly to potassium bromide, using the cheap potash liquors leached from waste wood ashes of neighboring sawmills. The electrolytic process brought with it both bromine and chlorine as well as caustic. The production of chloroform, a logical development to utilize the increasing output of chlorine from the fast-growing battery of electrolytic cells, brought with it both carbon bisulfide and sulfur chloride, which in turn led to carbon tetrachloride. This last was the first big tonnage Dow product. Its expanding market as a solvent led to constant increases in the capacity of the carbon bisulfide plant, so that when the rayon industry became a large consumer of bisulfide, Dow was in a strategic position to capitalize this new demand.

Chemical employment of the magnesium content of the Midland brine began with magnesium chloride, another early, big tonnage item that expanded enormously when the War shut off imports. Magnesium chloride led to magnesium sulfate (epsom salts) and magnesium carbonate. During the War development reached also into the organic field. Phenol and dinitrochlorobenzol were made for the Allies before our entrance into the conflict; and the use of bromine in the production of brom-indigoes was forecast when Dow became the first American manufacturer of synthetic indigo. Many additional brine wells were drilled and production of bromine and chlorine, essential for many munitions uses, was pushed. Mustard gas was made from ethylene and sulfur chloride. This was the first industrial production in the United States, and persistent tradition in Midland says that this Dow product was the only American-made mustard gas actually to reach the battlefront. With home-made phenol it was logical to make salicylic acid and the various salicylates, and the extension of the Dow line into pharmaceuticals and perfume bases followed.

So this process of "extracting the chemical possibilities of brine" has continued, some of the most important developments being a new process for aniline, like the phenol process in that it is especially adapted to the Dow operations: the production of the chlorides of magnesium and calcium by new processes; the synthesizing of acetic anhydride from sodium acetate and sulfur chloride. And finally, and especially interesting since they were Dr. Dow's pet projects during the closing years of his life, the extraction of metallic magnesium, which resulted in a series of extremely lightweight alloys.

This resumé of the practical working out of Herbert Dow's philosophy of chemical manufacturing, by omitting the details, creates a misleading impression. Just as the great modern plant, stretching a full mile along

the Tittabawassee River, has blotted out the tiny wooden building in which bromine was first produced, so this catalog of triumphs obscures the hours of patient research, the days and nights of heartbreaking work in every new unit of that now gigantic plant, the bitterly fought sales battles. So too, the tall figure of a young chemical engineer with a black Van Dyke beard and bright blue eyes that snapped with boundless energy, is hidden behind the big, friendly, mature executive who was so often mistaken by strangers for President Harding.

Accordingly, among the younger members of the Dow chemical community the favorite anecdotes of the early days are those that now seem to be apocryphal: Dr. Dow riding bicycle races for a watermelon prize and playing Santa Claus, his hair and beard all white with corn-starch, handing out presents to the entire staff which gathered in the shack that served as laboratory, drafting room, and accounting office. Best of all they like the story of the tar roof. When the wooden buildings were roofed with tar paper, a regular maintenance job was to keep these coverings sound by frequent retarring. Watching a careless boy leisurely at this work, Dr. Dow instead of reprimanding him, invited him down from the roof for a practical demonstration of how such a job should be done. He himself climbed up and began laying the tar-brush about with such effect that within a few moments he had completely surrounded himself with a broad band of fresh tar. There he perched on the rooftree, marooned in a sticky sea from which he was only rescued with difficulty by three men, an additional ladder, and a long plank. Nobody laughed more heartily than did Dr. Dow himself, for he had a strong sense of humor and a thoroughly democratic attitude towards all, and the closest personal intimacy grew up in the "Dow family".

Even during the first eight years when commercial progress lagged woefully behind technical improvements Dr. Dow had high courage and the assurance of success. His enthusiasm of faith he communicated to his associates by trusting them and encouraging rather than criticizing.

About 1900 the nucleus of the great Dow organization began to grow. From Case were recruited Thomas Griswold, Jr., and Edwin O. Barstow, respectively engineer-designer and operating chemist. These two and Dr. Dow used to argue hotly over ways and means, so that Earl Bennett, a Midland boy hired as a bookkeeper and shipping clerk, confesses that sometimes the rest of the little staff, huddled outside the laboratory door, feared that they would have to break up a pitched battle. But sooner or later, Dr. Dow's deep voice would break out in the dulcet strains of "Old Black Joe" and the battling trio would end their discussion in a roaring chorus. In 1906 Charles J. Strosacker came from Case to Midland to contribute mightily to the development of chloroform, carbon tetrachloride, carbon bisulfide, and during the War to the indigo process. From Case also came Mark Putnam to work on salicylates and later on aniline oil. From the University of Michigan was drawn another young organic chemist, William J. Hale, a dynamo of ideas, to whom belongs chief credit for the famous phenol process. In 1916, James T. Pardee, long a stockholder and director, came to help handle the fast-growing business end of the enterprise.

These are but a few of the group of good men Dr. Dow bound to himself, mentioned because they were longest and closest associated with him. His story, as he himself was forever insisting, is peculiarly the story of building up an organization. His was an original genius, stronger possibly in engineering than in chemistry, with a driving urge to find out if chemical operations might not be carried on in some new, shorter, cheaper way. Often he discarded little apparatus for large. Big units, as he was always pointing out, require no more control than small units, and far less control than a battery of small ones. When, in 1930, he was awarded the Perkin medal, his paper was a masterful exhibition of the economics of the large unit and automatic control in chemical production.

Dr. Dow's courage and originality were tested in the commercial exploitation of his brine products. At first, as was then trade custom, Dow chemicals were sold through agents: Edward Hill in New York, Fred Clark in Cleveland, and Ellis Jackson in Philadelphia. In 1901 he was one of the first American chemical makers to send out his own salesmen; but this was not successful until 1904 when Rupert E. Paris became sales manager. He was succeeded in 1908 by W. H. Van Winkle, who left in 1917 to establish a sales agency of his own.

Photograph taken at the same time as the one opposite, showing in the rear, to the left, the original bromine plant of the Midland Chemical Company; and to the right, the rear ends of a battery of decomposer houses.

When Dow first began to market bromine the price was a dollar a pound, and although offered for half this price, leading American pharmaceutical houses refused to buy. They were importing refined salts from Germany and were loathe to undertake this additional manufacturing or to jeopardize their German connections. Accordingly, Dow went to work on the bromo-cyanide gold extraction process and finally contracted to supply large quantities of bromine to the Telluride Reduction

Company of Colorado at 19.3¢ a pound. Well and plant capacity were greatly increased, but still Dow was unable to fill the rush of orders so down to Pomeroy, Ohio he went to purchase bromine at 25¢ to fulfill his obligations. Fearful over necessary supplies the Telluride people switched to another extraction reagent, cancelling their contract, and leaving Dow in a most uncomfortable position. It was then that Dr. Dow determined to manufacture bromine salts in a large way.

Despite a duty of 25 per cent., the German Bromine Cartel commanded the American market where they were selling potassium bromide at 40¢, the same price as in Germany. The first Dow shipment was to Japan and negotiations were proceeding towards contracts with two American pharmaceutical houses when there suddenly appeared in Midland one Herr Jacobsen, envoy of the Cartel. Dr. Dow was with his family en route to California; but he was recalled by telegram and the famous war declaration was delivered on neutral ground at a hotel in St. Louis.

Said the German envoy, "You are shipping bromides out of the United States, is it not so?"

"Yes," Dr. Dow admitted.

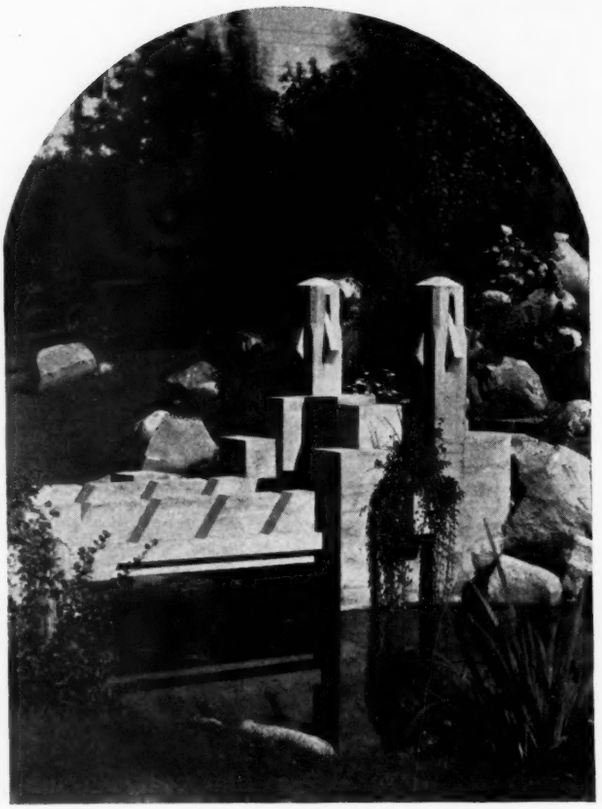
"That," exploded Jacobsen, "we cannot allow."

"And how do you propose to stop us?"

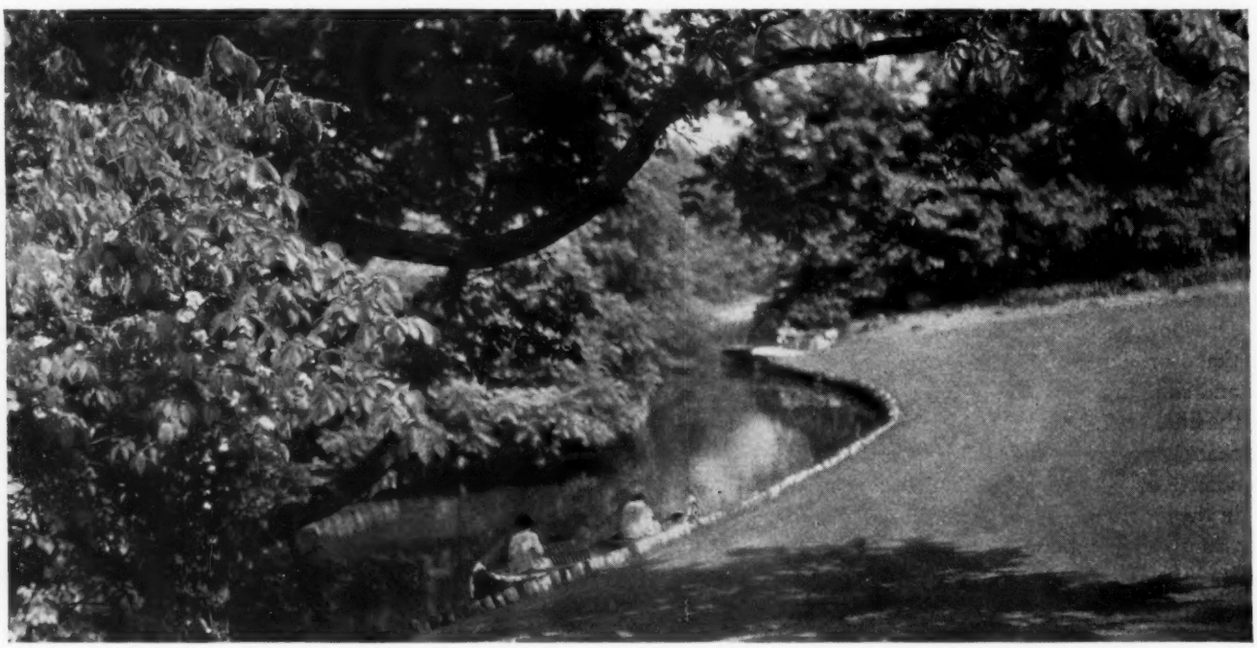
"For every pound that you export, we will import into the United States two pounds."

"Those arrangements, my dear sir, are entirely agreeable to the Dow Chemical Company, and I don't see that you and I have anything more to discuss."

Off stamped the German envoy and two days later his agents in New York flooded the trade with a circular letter pricing bromide at 20¢. Dr. Dow immediately decided to carry the war into the enemy's country. An agent in Germany was liberally stocked with American



Dr. Dow's originality found expression in a number of distinctive garden groups upon his great estate. Above is a modernistic garden. In another section of the grounds was a perfect reproduction of an old Japanese garden, which was designed and laid out by one of the most distinguished landscape gardeners of Japan, who was brought to this country by Mr. Dow especially to do this work for him. On the grounds are a swimming pool and many acres of beautiful lawns; but the outstanding feature of the estate and Mr. Dow's own particular pride and joy were the apple orchards where he grew large crops of the favorite commercial trees and experimented with many rare, unusual varieties of the apple family.



No one who has approached Midland by train or by motor over the sandy hills stripped naked of their pine forests but can appreciate the labor and skill that has created this combination of shade trees and velvety lawns.

bromides and a price exactly 25 per cent. (the amount of the U. S. duty) below the Cartel's domestic quotation was announced.

For two years the battle raged, and then the Germans agreed to withdraw from price competition in the United States provided that Dr. Dow would stop shipments to Germany. Here again Dr. Dow put into practice his philosophy of chemical prices, for in 1909 he entered into ten year contracts with Mallinckrodt and Powers and Weightman based on the average price published in the trade papers. At this time this was 12½¢. When the World War started, domestic quotations ran up to $2.50 a pound, which at the agreed discount netted Dow $1.70 at a time exporting brokers in New York were bidding as high as $4. Throughout the War, not only did Dr. Dow live rigidly up to this contract; but he also materially increased the amounts which he shipped to his regular customers, enabling them to take advantage of the war export business.

Jokingly Dr. Dow attributed his scrupulous integrity to his New England ancestry. For although born in Bellevue, Ontario, February 26, 1866, both his parents were of old Connecticut families, and in that state, in the town of Birmingham, his younger boyhood was spent. His father, Joseph H. Dow had married Sarah Bunnell, whose father exerted a potent influence on the growing boy. Together, they roamed the woods on long tramps, collecting birds' eggs and arrow heads, minerals and butterflies. His love of flowers and trees was doubtless cultivated under his Grandfather Bunnell's guidance, for the old gentleman was a great gardener.

In later years horticulture became Dr. Dow's absorbing hobby. His estate of over a hundred acres with its Japanese and its modernistic gardens and its great apple orchards was not only famous for its beauty but also for the wonderful quality of its fruit. Such was the practical bent of his mind that even his relaxations must always be grounded upon some useful purpose. For exercise he delighted to plant trees and shrubbery, digging the holes himself, and transplanting to rearrange the plan of his gardens.

These interests he carried over into the plant in the manufacture of insecticides, and they reached out also to embrace the whole city. When he first moved there Midland was a muddy, ugly derelict of the lumber boom that had stripped the rolling landscape of its forests of white pine. By precept and example, by his liberal gifts and wise planning, he helped transform Midland into a notably beautiful community of homes with fine grounds and splendid parks. These horticultural triumphs he accomplished in a most unfriendly environment of sandy soil, hard winters, and short growing seasons.

To Midland he was always a practical benefactor. His assistance secured the Carnegie Library and his ideas made the Midland County Court House a building of rare artistic distinction. The Community Center was his direct gift and without his help the Country Club could never have been realized.

Keen as his public interests and absorbing as his industrial enterprises always were, Dr. Dow was a devoted husband and father. Home and family were the lodestone of his life. On November 16, 1892, he married a wife from Midland, Grace Ball, and they had seven children. Save one boy who died young, all their children grew up and married; Helen to Dr. William J. Hale; Ruth to Leland I. Doan; Willard, who has succeeded him as president of the Dow Chemical Company, to Martha Pratt; Alden, a successful architect, to Vada Bennett; Margaret to Harry Townsley, a physician of Ann Arbor, Michigan; and Dorothy to Anderson Arbury, a dentist of Ann Arbor.

While the Dow Chemical organization was never a family affair, and its founder was far too just and farsighted to countenance nepotism, nevertheless in the Midland community many close connections have been bound together by marriage. Thomas Griswold married Dr. Dow's own sister, Helen; and E. W. Bennett's daughter married Dr. Dow's second son. Two of his sons- in-law are with the company: the one contributed the important phenol process, the other is sales manager; both won their spurs without influence.

On October 15, 1930, in his sixty-fifth year, Herbert Henry Dow died at the Mayo Clinic, having failed to rally from a serious operation. Two days later the people of Midland paid their first fellow-citizen a very great, quite spontaneous tribute. It was a cold, drizzly afternoon. The special train bearing his body was over an hour late. Great throngs stood in the rain, neighbors and employees, friends all, waiting there patiently to welcome him home. Just as his body was being borne from the train a great gust of wind blew the gray, chilly mists away and through a rent in the lowering clouds the autumnal sunset suddenly flashed all scarlet and gold. From the sorrowful throng arose a great reverent sigh of thanksgiving. There, that, they felt, was the right welcome for this courageous fighter, this bold leader, this firm friend.

Tungsten Production '34

The tungsten mining industry was substantially revived in 1934, the quantity of domestic ore shipped being by far the largest since 1918. In 1934, 2,049 short tons of concentrated tungsten ore (reduced to an equivalent of 60 per cent. WO_3) produced in the United States, were sold, compared with 895 short tons in 1933. U. S. Bureau of Mines estimates that the average value per unit of the tungsten concentrates sold increased from $9.58 in 1933 to $14.57 in 1934. The price for 1934 is the highest average peace-time price. Shipments of tungsten concentrates were made from Arizona, California, Colorado, Idaho, Nevada, New Mexico, and Washington in 1934.

Open Prices for Fertilizers

An Interpretation of the Workings of the Fertilizer Code Practice by the Man Who has Administered It.

By Charles J. Brand

FALSE reports, secrecy, ignorance of the true facts as to prices, terms, and conditions of sale, suspicion, and distrust lie at the root of most of the destructive competitive practices that harass business. Open pricing is a device whereby producer, distributor, and consumer may act intelligently in making business decisions in all matters that involve price. Open pricing does not involve, directly or indirectly, agreement upon price, coercion to file or observe particular prices, or action in any way inequitable or adverse to the consumer.

In the fertilizer industry the open pricing provisions of the Code have profoundly and in the public interest decreased fraud and misrepresentation, price discrimination, destructive price-cutting.

The Fertilizer Code specifically controls the conduct only of those engaged in producing—including importing—fertilizers and fertilizer materials. Each such producer is required to file with the Code Authority:

1. A statement showing the zones or areas in which he intends to do business.

2. A schedule by such zones of the prices in effect or to be charged for all fertilizers sold or offered for sale to dealers, agents, or consumers, together with the terms and conditions applicable thereto; and

3. Each producer, simultaneously with the filing of any schedule for any zone with the Secretary of The National Fertilizer Association, is required to mail or deliver true copies thereof to other producers in such zone.

Each producer is absolutely free to name in his schedule any price and to state any terms or conditions of sale that he chooses. He may change his schedule and his prices as it suits his business needs.

A producer may not begin to make sales or offers for sale until his schedule has been filed and the effective date has arrived, which is 10 days from the hour of filing. Whenever a producer changes his prices, terms, or conditions, he is required to prepare and file a new schedule and serve it precisely as he did the original.

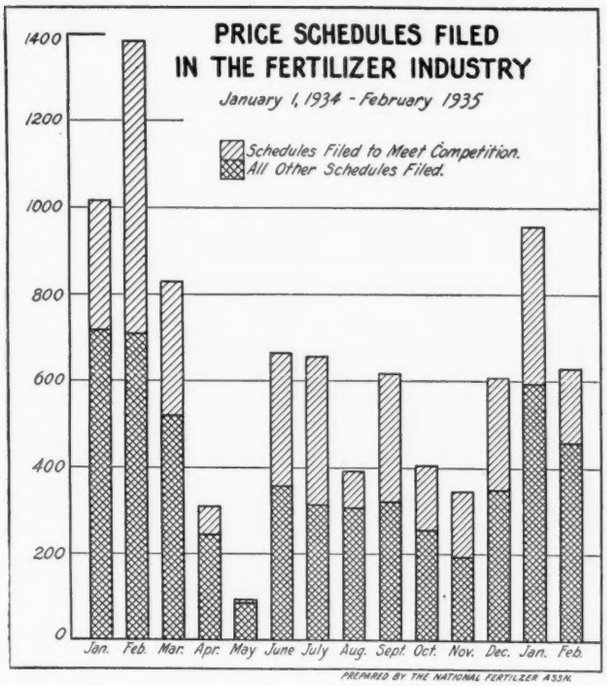
If a changed schedule is filed to meet the competitive schedule of another producer, the schedules of both become effective at the same date and hour, provided the schedule filed to meet the competitor's schedule is received at least 48 hours in advance of the effective date and hour of the schedule first filed.

Clear-cut, definite rules and regulations have been prepared and printed and distributed to more than 1,200 persons, firms, and their branches engaged in the industry. No set or uniform form of schedule is required, but a schedule must be explicit and definite in its contents.

Upon receipt in the filing office, a schedule is stamped with the hour and minute of its filing. It is immediately checked to determine whether it complies with the Code and the regulations. Thereupon a telegram is sent to the filer advising him of the effective date and hour of his schedule. Subsequently, and within 24 hours, a printed "List of Filed Price Schedules" is mailed by first-class mail to every producer who may compete with the filer in a particular zone.

No schedule is denied filing because of faults inherent therein. The "List of Filed Price Schedules," however, contains a description of any faults contained within the schedule that require correction. Prices become known almost instantly in the fertilizer-using territories through the publicity given by agents, dealers, local manufacturers, county agricultural agents, and other instrumentalities.

Too many people ascribe to the term "stabilization"



the unfair implication of unreasonably high prices. I have detected in many discussions of price-protection provisions of codes an innuendo or actual charge that they are used as an instrumentality or contrivance unduly, unreasonably, and unfairly to enhance prices. Stabilization of industry, effected by lawful and economic processes, contemplates doing those things which from the standpoint of public welfare should be done cooperatively rather than competitively. If the acts so done do produce stability—by which I mean equilibrium between supply and demand in the industry with exchanges of goods taking place under conditions of efficient operation at a reasonable margin above cost—the result is in the interest of both the fertilizer industry and American agriculture which it is designed to serve. Such results so achieved will not be the result of undesirable, improper, or unlawful acts of any kind.

At least 95 per cent. of the individual operators in the industry have expressed approval and satisfaction with the improved competitive conditions that have been achieved under open price scheduling. An enormous amount of educational work has been done. A weekly organ is distributed to over 1,200 addresses, and ad interim other informative material is supplied. At the outset our Code was sent to no less than 25,000 addresses, including all agricultural workers throughout the United States as well as members of the industry itself.

It is frequently stated that codes have operated to the injury and disadvantage of small producers. This allegation is wholly untrue so far as the fertilizer industry is concerned. I give a single illustration: Based upon the tax tag sales of the State of Alabama, comparing the gain in tonnage between 1932-33 and 1933-34 seasons, large companies increased their volume of business approximately 7 per cent.; intermediate sized companies nearly 52 per cent.; and small sized companies over 112 per cent. A similar situation is disclosed by the tax tag sales of a number of other states, leaving no doubt as to the facts.

Demand for fertilizer depends upon the income of the farmer and particularly upon the income of cotton and tobacco farmers. In 1930, fertilizer sales totalled nearly 8,200,000 tons. In 1931 they had dropped to 6,300,000 tons and in 1932 to 4,300,000 tons in round figures.

The index number of mixed fertilizer prices fell from 110 in 1928 to 73 for 1933. In November, 1934, the wholesale fertilizer price index stood at 82, a recovery of 9 points or 12 per cent. The index number of farm products prices fell from 149 in 1928 to 70 in 1933, and as of November, 1934, it had again attained a level of 102, compared to the five-year pre-war index. Between September 15, 1933, and September 15, 1934, the index number of fertilizer prices rose 6 per cent. In the same period the index number of all commodities bought by the farmer increased 9 per cent., while the index number of prices received for farm products at the farm increased 28 per cent.

It would seem a fair inference from this statement of fact that neither the Fertilizer Code nor its open price provisions have adversely affected the farmer. The absence of complaints so indicates.

Effect of Code on Distributors

There has been some slight complaint, very moderate in extent, on the part of distributors. This has been due largely to the fact that their profit margins have been decreased under the more efficient and fairer distribution of fertilizer that exists under codal as compared with pre-codal conditions.

Without open pricing there is grave doubt that the industry could have met its increased wage requirements. According to our best estimates the wage provisions of the Code increased the pay rolls of the industry approximately $4,000,000. In March, 1934, the number of employes showed an increase of 89 per cent. over the previous March, and the pay rolls showed a total increase of 108 per cent. over March, 1933.

During April, 1934, there was a decline of 30 per cent. in the average hours worked weekly by employes, while the average hourly earnings increased 81 per cent. over April, 1933. At present no employe in the industry earns less than 25 cents an hour in the South, 35 cents an hour in the North and Northwest, and 40 cents an hour on the Pacific Coast. Before the Code was adopted unskilled labor in the South received 14 cents or even less an hour. In passing, I should say that the fertilizer industry is exceedingly seasonal; on the average approximately 35 per cent. of the total distribution of the year takes place in the month of March, leaving only 65 per cent. for the other 11 months. To say that 35 per cent. of the total distribution of from four to eight million tons of material is made in a single month inadequately describes the situation.

In certain crop areas where special crops are grown,

90 per cent. of the sales is sometimes made in a period of four to six weeks. This peak arises from the demand of farmers for their requirements at the particular time of planting.

Price schedules are intricate documents in our industry; they are not single sheets, generally speaking, but are from a few to even 30 or 40 pages long, describing not only the prices of hundreds of different chemical analyses, but giving all of the terms and conditions of sale both for time and cash transactions, discounts, compensations, and other features.

Our Code provides a waiting period of 10 days. If a waiting period were not provided, a filing producer could start selling immediately upon issuance of a new schedule and thus preempt and monopolize a large part of the business available in any given territory. This would tend to stifle fair competition rather than to promote it. Examination of our files and investigation within the industry will disclose that the 10-day waiting period has not been used to coerce or to force producers to raise their prices. The time element involved in the serving of schedules upon competitors and the study of such schedules, necessarily complex in many cases, makes a waiting period almost imperative in the industry. There are more than 800 fertilizer producers in the United States. Competition is keen at the present time and in the pre-codal period was too often destructive.

Code Administered by Zones

For the purpose of administering the Code, the United States is divided into 12 zones and all open price schedules are filed by zones or subzones and reflect the different economic conditions arising from the production of different crops in different sections of the country.

The Fertilizer Code was approved October 31, 1933, and became effective November 10, 1933. Since that date approximately 11,790 schedules have been filed. At the present moment 2,065 effective schedules are on file. The greatest number of schedules filed by one producer in a single zone in the period is 24. Many companies have filed as high as 12 to 16. A few have filed only two or three. The greatest number filed in a single day was 225.

There is constant adjustment of prices, terms, and conditions in all territories.

In summary, open price scheduling:

1. Gives desirable stability to the market in the interest of both producer and consumer.

2. Protects, if need be, the smaller manufacturer by disclosing to him the true state of competition in his operating territory.

3. Removes discrimination as between farmers, so that any one producer must sell a given analysis at a given point at an open price arrived at by open competition, available and well known to all consumers.

Industry's Bookshelf

Corporate Profits as Shown by Audit Reports, by W. A. Paton, 151 p. National Bureau of Economic Research.

A summary of the balance sheets of 714 small and medium sized corporations for the years 1927-1929 which reveals that in that booming season, the three years' average earnings were 9.2 per cent. for manufacturing companies against 6.3 for trading companies; a general average of 8.4 per cent. Furthermore, the average amount of net assets, covered by liabilities, was under 32 per cent.; and 256 companies paid no dividends during the period, 65 paid for one year, 100 for two years, and only 278 paid dividends throughout all three years. These are surprising, if not stimulating, facts. This book ought to have a wide and careful reading among executives and accountants.

The Soya Bean, by Elizabeth Bowdidge, 83 p. Oxford University Press. $2.

Following the farm chemurgic meeting out at Dearborn this useful little book ought to sell well to those farmers and publicists interested in diversifying our crops with this useful oriental legume. It is based largely on the Ford experiments in England, and is packed with facts about the trade and the uses of soya beans.

The Formation of Capital, by Harold G. Moulton, 207 p. Brookings Institution. $2.50.

As a sequel to the Brookings' studies on our productive and consumptive capabilities, Moulton finds our present need is less for the further accumulations of capital and more for wider distribution of purchasing power in order that a sustained increasing consumption may furnish constant economic stimulus to build further productive capacity. In the main, we agree with his diagnosis of the situation during the twenties, but we suspect that when the data of the thirties is available for analysis, the needs of the forties will again be for the rebuilding of investment funds.

Industrial Germany, by Herman Levy, 245 p. Macmillan. $3.50.

Reliable historical study of German cartels from the British point of view, but stops short of the Nazi industrial situation, so that its conclusions are today inconclusive.

It's Your Money, by Barnet Hodes, 218 p. Reilly & Lee (Chicago). $1.

An Illinois Tax Commissioner expertly advocating the simplification of state, county, and city government organization as the quickest, surest means of cutting our tax bill. A timely, readable, authoritative book that several hundred thousand more citizens than will do so ought to read.

Stock Market Profits, by R. W. Schabacker, 342 p. Forbes (New York). $5.

Inspired no doubt by the popularity of "The Daring Young Man on the Flying Trapeze," this revival of happier days ought to be a good seller. It is a veritable dope sheet of all dope sheets, a compendium of forecasts, and a systemization of all systems, an extremely valuable book, if you don't take it too seriously.

Mobilizing for Chaos, by O. W. Riegel, 231 p. Yale Press. $2.50.

The right of the State to formulate public opinion is acceded in Russia, Germany, and Italy. It is a right our own Government is very concerned to acquire. We have all heard much about this modern propaganda problem, but its implications escape us. They are "tied and weighed" in this extremely challenging little book.

Silver —

for Chemical Equipment

By C. H. S. Tupholme

SILVER is now no longer a rare and costly metal, fit only to rank with gold as currency and ornament. It has fallen from its high estate, and within the last two or three years its price has permitted its use in the construction of apparatus weighing up to three or four hundredweight, the pure metal being used throughout.

Chemical authorities are divided on the properties of silver, though one of the most useful guides as to its possibilities in chemistry was given by McDonald in a paper before the Chemical Engineering Group of the Society of Chemical Industry. According to McDonald, oxygen, whether dry or moist, has no chemical action on fine silver at any temperature up to the boiling point of metal. There is no evidence that either water or steam at any temperature below the decomposition point of the latter has the slightest effect on the fine metal. Above that point more or less decomposition takes place through heat alone, oxygen is absorbed, and spitting takes place on cooling.

The halogens all attack silver to a greater or less extent, depending on temperature, the presence of moisture, and other circumstances. Frequently, however, the coatings of insoluble chloride of silver produced by solutions of chlorine are very hard, and can only be removed from the metal by means of abrasives or strong solvents such as sodium cyanide. In these cases attack ceases as soon as the coating has become thick enough to be protective, and thus silver may sometimes be used in the presence of a halogen.

Hydrobromic and hydriodic acids, both as gases and in solution, attack silver at all temperatures, but this is not the case with hydrofluoric acid. The extent to which dry hydrogen chloride free from oxygen attacks silver is doubtful, but when mixed with air the metal is quickly covered with a violet coat of silver chloride. Strong hydrochloric acid attacks silver slowly at a rate depending on the temperature and on the presence or absence of oxidizing agents. If the latter are present the attack is much more marked, as conditions are favorable to the production of nascent chlorine. A piece of silver completely immersed in strong (36 deg. Tw.) commercial acid lost weight at the rate of 0.208 grams per sq. metre per hour at ordinary temperatures, and at five times this rate at the boiling point. In this acid the metal remains perfectly bright, the silver chloride dissolving as fast as it is formed, and the attack is therefore progressive. The same acid diluted with four times its volume of water gave no measurable loss of weight in 19 hours at ordinary temperatures, but on boiling the loss was at the rate of 0.443 grams per sq. metre per hour. The same rate of corrosion occurred on boiling with stronger acid (1 : 1). On adding to each solution 10 per cent. by volume of 10-volume hydrogen peroxide and immersing the metal for 16 hours at room temperature there was a gain in weight of 2 mg. in the stronger acid and 9 mg. in the more dilute, showing that attack had taken place in each instance, but that the silver chloride formed had dissolved to a greater extent in the stronger acid.

The neutral halides, such as sodium chloride, sodium iodide, ferrous chloride, etc., very slowly attack silver in the presence of air, but a protective film is soon formed in all cases except where silver chloride can go into solution. With the higher chlorides, such as cupric chloride, ferric chloride, and mercuric chloride, the attack is naturally more marked, but the same conditions apply regarding protection.

Solution of the caustic alkalies are without action on silver, and in the solid form they can be melted and cast safely in vessels made of it. If, however, the fused alkali is left in the molten state in contact with both the metal and air for a long time (say 6 hours) the melt takes on a slight yellow tinge, which has been ascribed to the presence of silver oxide.

If oxidizing agents such as sodium nitrate are present in the melt, there are some signs of attack. The surface of the metal has an etched appearance, and often small spangles of metallic silver appear floating in the melt, as though some compound had been formed and immediately dissociated, but no loss of weight was noticed. Liquid ammonia is stated to have no action on silver. Ammonia solution (sp. gr. 0.880) causes a slight loss of 0.022 gram per sq. meter per hour during a 10 hours' exposure at room temperature, increasing to 0.044 on a further 15 hours' trial. Solutions of cyanide, of course, attack silver freely in the presence of air or oxidizing agents.

Sulfur slowly corrodes silver at ordinary temperatures by mere contact. Pure dry sulphuretted hydrogen is said to be without action on it, but the presence of a trace of oxygen causes a rapid formation of silver sulfide. A wide range of sulfides and other similar compounds act in the same way, and silver tarnishes freely in air contaminated with sulfur compounds.

The action of sulfuric acid on silver is very interesting, for at room temperature neither the dilute nor the concentrated acid has any appreciable effect unless oxidizing agents such as ferric sulfate or hydrogen peroxide are present, when a loss of weight becomes apparent, but on boiling, the dilute acid has some action. With acid of sp. gr. 1.355 (45.4 per cent. H_2SO_4) kept at its boiling point, 123 deg. C., and with its dilution maintained by the addition of water, the loss was found to be at the rate of 0.794 gram per sq. meter per hour. Hot concentrated acid dissolves the metal freely and rapidly with evolution of sulfur dioxide and formation of silver sulfate, the action beginning relatively sud-

denly at a certain point of concentration and temperature. Unless the acid is sufficiently concentrated the metal will only dissolve at a rate comparable to that found for dilute acid. Rapid action commences about 265 deg. C., and sulfur dioxide is freely evolved between that temperature and 270 deg. C.

Resistance to acetic acid has given silver its chief use in chemical plant construction. In the manufacture of acetate silk fine silver condensers are used in the recovery of solvents; while the organic solutions employed require valves, cocks and taps made from silver alloys. In the viscose rayon industry, on the other hand, silver has not been used, owing to the sulfurous nature of the material to be handled. In Britain solid silver is being used for the following purposes:

(1) Boiling pans of all types, either steam jacketed or heated by means of coil.
(2) Cooling or heating coils.
(3) Vessels of all shapes, square, cylindrical, oval, etc.
(4) Complete condensing units, worm or grid type.
(5) Control valves, cocks, taps and similar fittings.
(6) Pipe lines up to any length.

In addition to the above, new plant in base metal may be either lined or covered with a thin layer of pure silver and in some cases this work may be carried out on existing plant. This latter depends largely upon the condition of the surface to be treated.

Pipe lines can be made with a thin lining of silver in lengths up to 20 feet, suitable provision being made to join together individual lengths of pipe by means of flanges, so that any desired length may be built up. When it is necessary to supply stirring or similar gear of robust dimensions for use in connection with boiling pans, etc., this may readily be covered with a thin layer of solid silver sheet, however intricate the design.

In all this work nothing in the nature of a solder is used to make the joints. All joints are welded (or "fused") and the vessels, etc., are, if anything, it is said, stronger at these joints than elsewhere. As only one material (viz., pure silver) is presented to the substance to be contained in the plant there is no risk of electrolytic action taking place as is the case when solders or brazing materials are used to make the joints. When silver linings are fitted a definite union is made between the lining and the outer vessel, thus obviating the risk of blisters or air pockets between the two metals.

In the distilled vinegar industry the use of copper, even when tinned, has not yielded universally satisfactory results, and trouble has occurred when the vinegar made in it is employed as a pickling medium. Small quantities of copper in solution, even though not toxically serious, are apt to be absorbed by light-colored pickles, such as onions, which assume a pale green complexion highly undesirable in modern competitive display. The gunmetal or bronze taps or storage vessels give rise to discoloration and unpleasant flavor in some of the essential oils used for flavoring food, while in their distillation tinned copper stills and condensers produce results similar to those observed in the vinegar industry. Moreover, apart from the contamination of the product, the life of the apparatus itself is short. Fine silver stills and condensers and silver-alloy taps and cocks are being generally employed to overcome the manifold troubles experienced in these particular industries. In other food-preparing trades silver has found various relatively small uses, although in most of them the concentrations of acid handled are such as can be expressed only in terms of pH. For instance, in the milk, cider, and brewing trades it is used for siphons, pipe lines, pasteurizing coils, and the nozzles of filling machines.

Again, according to McDonald, in the manufacture of acetate rayon silk fine silver condensers are utilized in the recovery of solvents; while the organic solutions employed require valves, cocks and taps made from silver alloys. In the manufacture of synthetic acetic acid silver is used as a catalyst in the form of fine wire mesh to promote the oxidation of ethyl alcohol to acetaldehyde. It is also used in the distillation of phenol.

Not only is the pure metal used and, to a less extent, its copper alloys, but also what is known as "doublé," in which fine silver sheet is rolled on to copper or other base metal, thus reducing the first cost of the apparatus.

Pipe lines can be made in this way by drawing a tube of the base metal over a seamless tube of silver, the combination being sufficiently strong to withstand complete vacuum without separation. The outer tube can be made of suitable thickness to stand high internal pressures. Coils for heating corrosive liquors also can be made in the same way, but with the silver outside. Small vessels can be made of the "doublé" sheet quite satisfactorily, but with larger sizes jointing difficulties arise which rather limit its application.

Another method of obtaining some of the valuable properties of silver without its cost is to coat copper or other vessels electrolytically, but this is not very satisfactory for chemical processes, since the coating has frequently weak patches and pores and is so thin that stirring or the mere movement of the contents created by boiling removes it in course of time. It is, however, used in plant for jam-making by some firms, and seems to give satisfaction. Solid homogeneous silver linings can be obtained for existing vessels provided that their construction is suitable, and where silver-plating has given poor results, lined vessels have been found to give good service.

In inorganic chemical processes the present uses of silver are less evident than in organic ones. The mineral acids generally attack it, and there are many more alternative metals available which cannot be used in the organic processes. There is no reason why it should not be used in handling cold hydrofluoric acid of all strength, dilute sulfuric acid up to the limits mentioned above, dilute hydrofluoric acid provided the protective coating of silver chloride is not removed, and other substances indicated in the section on the chemical properties of the metal.

Industrial Uses of White Mineral Oils

By Dr. S. Schwabacher

INDUSTRIAL uses of white mineral oils, as those of all other petroleum products, have increased considerably in the past two decades. The public generally understands as white mineral oils the high viscosity Russian Oil (paraffin oil, liquid petrolatum, U. S. P.), which is used for internal purposes, and besides, it knows that white oil is used in the manufacture of pharmaceutical and cosmetic preparations. But the wide variety of industrial uses, where white mineral oils, whether U. S. P. or technical grades, are applied, are not generally known.

In view of the steadily increasing volume in the consumption of these white oils, it may be interesting to list the main industries and purposes in which these oils are employed: Agriculture for spray oil for orchards and cattle insecticides; baking, macaroni, etc., as dough divider oil; candy as slab oil; paper as apple wrapper oil; in egg packing as an egg preserving oil; meat packing for cleaning of equipment; in coffee as white oil for coffee roasting; in the food industries as a cheese preserving oil, and as a dietetic food, and in salad oil.

In pharmaceuticals and cosmetics for internal lubrication, nasal sprays, salves, creams, and ointments; in the textile industry in cotton, wool, rayon and silk oils—compounded oils, and machinery oils; in the electrical field for transformer oils and switch oils; in refrigerating in ice machinery and refrigerator oils; in metals as an anti-rust oil and cutting oil; in the automobile field for polishes, and upper lubricants; in the manufacture of lamp shades as lamp shade oil; in watches for lubrication.

From this list, which is not entirely complete, only a few of the more important uses are discussed.

In the textile industry white mineral oils, particularly compounded with animal or vegetable oil and certain chemicals, are used for various purposes other than machine lubrication.

Raw stock oils are used in fibre lubrication of wool, rayon and cotton products, prior to spinning. Compounding of mineral oils with other oils will prevent rancidity and reduce bad odors.

Softening or finishing oils are applied where a certain quantity of oil is to be retained in the material in order to improve the feel. In the silk industry the softening oil is used prior to "throwing".

Soaking oils are used in subjecting raw silk to "soaking" in order to soften the gums and render the thread pliable. The mineral oil in the compound softens the action of the soapy mixture on the silk. The oil must leave no odor and have sufficient viscosity.

Knitting oils, as used in the lubrication of yarns, prior to knitting, are generally compounds of mineral oils with animal or vegetable oils. An important problem in the use of knitting oils is the prevention of rust or corrosion of needles. In the manufacture of wool products mineral oils are used as machine lubricants and for oiling the material for softening the de-greased fibres. Use of mineral oils in the compounds is more economical than the use of animal or vegetable oils alone. The advantage of mineral oils or compounds of mineral oil and vegetable oils in textile operations is that the mineral oil has a low acid content (pH), does not gum or harden, and does not oxidize readily.

White oils are employed in the lubrication of knitting machines. Stainless knitting oils of light viscosity are generally used. For shaft bearings and other lubricating purposes more viscous oils are necessary.

In addition to the above uses of white oil compounds for textile operation the following operations may be mentioned: Dyeing, degumming and delustering.

With regard to the resistance power against chemical and atmospheric influences, experience has shown that white oils made from naphthenic base crude are generally more suitable than oils from paraffin base crude. Therefore, transformer oils, for instance, where this resistance power is of particular importance, are widely made from oil of naphthene base origin.

In some cases, it also appears that, the higher the technical white oils are refined, the easier they tend to decompose or oxidize. For this reason, for certain purposes, oils slightly less refined are frequently being used to better advantage than the highest refined grades.

The volume of light viscosity white oils in emulsions for insecticides, orchard and vegetable sprays, is very considerable. In California alone about five million gallons of mineral oil are used yearly for these purposes.

For insecticides in household use a kerosene distillate is used as solvent and carrier for poisons, as pyrethrum extract, nicotine sulfate and others. For orchard sprays a heavier fraction than kerosene is used, up to 100 viscosity. The study of oil spray emulsions has become quite a science, and the U. S. Department of

Agriculture has published considerable literature on this matter.

The preparation of oil emulsions and their use in the orchard has to be watched carefully in order that the oil be properly emulsified and diluted. If the emulsion becomes broken and the oil rises to the top and separates, it is unfit for spraying purposes.

A distinction must be made between "dormant sprays" which are used before the trees are in leaf, and "summer sprays," to be used later. In the former, ordinary neutral oils are sufficient, while in the latter white oils are necessary, so that the unsaturated hydrocarbons in the mineral oil compound will not damage the fruit or the young leaves.

Mechanical refrigeration is a comparatively new industry; it is applied for the preservation of food, for the manufacture of ice cream, dry ice, etc. The problem of selecting the proper white lubricating oil is of great importance, as it is sealed into the compressor together with the refrigerant, for the lifetime of the apparatus. As the refrigerant comes into contact with the oil and may affect it, a fully refined white oil, free of moisture, is necessary, otherwise sludge or gum deposits may be formed which would cause damage. Therefore, generally U. S. P. oils are used, with a minimum of carbonizable substances, and a low pour test. This requires oils of naphthenic, not paraffin base. The principle of air conditioning is the same as that of refrigeration, and the application of white lubricating oils in the compressor is identical.

This discussion has been limited to only a few of the most important industries which use white oils, although new uses are constantly appearing in other industries. The white oil industry, in a comparatively few years, has expanded tremendously in volume as well as in the quality of its products, and the steady growth of American industry opens continuously new avenues for the uses of white mineral oils.

Credit is given to an article "Petroleum Products in the Textile Industry," published by The Texas Company in their magazine "Lubrication."

Aluminum Industry in 1934

To supply the mineral industry promptly with data on aluminum production and markets during the past year, the following information is furnished by the United States Bureau of Mines. New aluminum produced in the U. S. during 1934 amounted to 74,177,000 pounds valued at $14,094,000, compared with 85,126,000 pounds valued at $16,174,000 in 1933. In addition to market factors that affected output adversely in 1934, production was suspended for about a month during a period of labor difficulties, and another month was required before activity at the furnaces could be fully resumed.

The principal producing plant was that at Massena, N. Y., where approximately 54 per cent. of the metal made in the United States in 1934 was produced. Other works are at Niagara Falls, N. Y., Alcoa, Tenn., and Badin, N. C. The plant at Niagara Falls, however, was not operated in 1934.

World production of aluminum in 1934 is estimated at 169,000 metric tons, an increase of about 19 per cent. over that of 1933 (142,000 metric tons). There was a noteworthy increase in production in Germany and the U. S. S. R.

The use of aluminum in transportation was further extended. A 6-car stream-lined railroad train and a 5-section car, both constructed almost entirely of aluminum alloys, were completed during 1934, and one 3-car, one 8-car and two 9-car trains are now being built. Other railway equipment in which aluminum is extensively used includes hopper, tank, and sleeping cars. A street car in which aluminum construction has been extended not only to the body but to the trucks, axles, and wheel centers has been placed in operation.

Chemicals on the Farm

A Book Review by Ralph H. McKee

"The Farm Chemurgic," by William J. Hale, is avowedly propaganda for the use in chemical manufacture of raw materials produced by the farm and for that intense nationalism in which "lies the hope of scientific nations."

Agriculture has suffered from the failure of the Government to study its chemical and biological angles. All other aspects have received more attention than these basic angles, but "until the men in charge wake up to what chemi-biological requirements dictate," agriculture will continue to suffer.

Of the examples, one of the best given by the author is that of alcohol made from farm products and to be used in admixture with gasoline as motor fuel. Petroleum is a mineral product. A century ago the mineral output of this country was but half the weight of land crops. Today the ratio is reversed. Addition of alcohol, generally ten per cent., to gasoline has been adopted in twenty-one countries. In this country the use of such power alcohol is contemplated in bills presented to legislatures of six states of which two, South Dakota and Idaho, have passed this legislation. In general, use of power alcohol is accomplished by favoring tax differentials and thus, "by a mere subsidy of a few cents per gallon on alcohol made to enter the motor industry," bids fair to launch an enterprise outstripping the automobile industry itself.

The author calls attention to the advantages in the addition of ten per cent. of alcohol to gasoline, advantages well known to the scientific man though as yet but little appreciated by the public at large and, of course, subjected to "a broadside of opposition on the part of some of our oil corporations." Some of the advantages are reduction by half of the poisonous carbon monoxide produced, easier starting, increased anti-knock character, higher compression and hence smaller and cheaper engines, more complete combustion of the fuel and hence greater mileage per gallon in ordinary short haul use, cleaner spark plugs, larger additions of casinghead gasoline now largely wasted, and so on.

With such a change required in the composition of motor fuel there would arise many plants manufacturing alcohol for fuel and taking the product of 160,000,000 acres of land which "is almost half of all our land under cultivation." Such a change would require the labor "of our 10,000,000 unemployed" and "the greatest of skilled chemists and engineers." The government might well center its recovery plans on this one project alone. "No other project as yet suggested, outlined, attempted, or executed, can hold a candle to the alcohol in gasoline project and its future effect on civilization; and all we need to start it is the removal of state and federal taxes upon such motor fuel for a period of three to five years."

While the reviewer cannot always agree with all the biological chemistry given, he has, however, found the book stimulating, well worth reading and, for its purpose, an excellent presentation.

Chemical Raw Materials I —

Phosphate Rock — 2

AMERICAN production of phosphate rock began in South Carolina in 1868 and for twenty years this section was the sole domestic source of supply. In 1887 the first Florida phosphate came on the market, and with the gradual exhaustion of rich, easily worked, but limited Carolina deposits, soon took the leading position. Even since the development of the Tennessee fields in 1892 and the more recent workings in Wyoming and Idaho, Florida has maintained this leadership.

Phosphate deposits in Florida yield three forms of material: pebble, soft rock, and hard rock. The field areas of each form have been thoroughly mapped and the chemistry and geology carefully explored, still no theory of the history of the deposits is universally accepted. Their origin was guano, which seeping down upon limestone converts it to calcium phosphates, and also the remains of dead animals and fish. The time and the sequence, the chemical reactions, and the geological processes involved are complicated by the fact that southern Florida has been alternately sea bottom and dry land at least twice during the building up of these deposits. The whole question is still highly debatable, but this is a geological, not a chemical, problem.

Discovery of the South Carolina deposits forecast the finding of the Florida fields, and as early as 1876, Dr. J. C. Neale found pebble phosphate in Levy and Alachua Counties. In 1880 a low grade deposit was located in a stone quarry. In 1883 the owner, Dr. C. A. Simmons, mined this, and ground and sold it locally for direct application to the soil.

In 1888 placer deposits of pebble in the Peace River were commercially exploited by Capt. Francis Le Baron, and that same year the first large deposit of high grade hard rock was found by Albertus Vogt while deepening the well on his farm near Dunnellon. Within a year or two hard rock mining began in earnest in this section. The pioneer companies were the Marion Phosphate Co. (first shipment, December, 1889; first export to Liverpool, February, 1890) and the Dunnellon Phosphate Co. (began operations February, 1890; first export, London and Hamburg, May, 1896).

Development of the hard rock field was quick and thorough. Within a few years, the commercially workable area was mapped and over a hundred mining companies organized. Forty-one actually broke ground, but by 1891 all save eighteen had suspended operations. In 1914, there were fourteen companies mining and shipping, and twenty years later, 1934, seven large companies were producing land pebble (four of them controlled by fertilizer companies and one by the Oldbury Electrochemical Co., producers of phosphorus and phosphoric acid); three independent companies were marketing hard rock, while soft rock was mined and ground by two companies. Keen competition, more costly mining equipment, and more elaborate refining operations concentrated phosphate rock production in Florida into fewer, stronger hands.

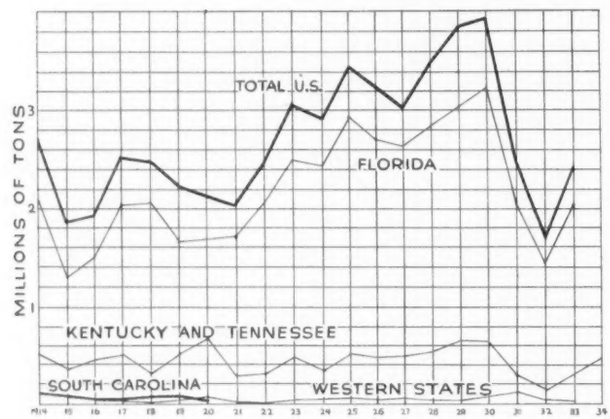
Land pebble, which accounts for roughly nine-tenths of the Florida output, occurs in beds or pockets of varying width and thickness, imbedded in a matrix of clay, soft phosphate rock, and sand. Sometimes these pebbles are associated with sharks' teeth and the bones of both land and marine animals. Beneath lays a bed-rock of phosphatic marl, varying from ten to thirty feet in thickness. Above is an overburden of loose sand, boulders, and clay.

Since these beds of phosphate pebbles are reasonably level and of fairly constant thickness, prospecting is simplified to locating a workable deposit and determining its extent and quality. In commercial practice 16 holes are bored to the 40-acre tract by means of a modified posthole auger, 4 inches in diameter, while a 4½ inch casing is sunk simultaneously. The phosphate matrix, removed by the auger, is dried, washed over a standard screen, and the pebble phosphate dried, weighed, and analyzed. By the formula, area $\times$ thickness of the bed (in feet) $\times$ weight of matrix per cubic foot (in pounds) $\times$ percentage of rock in the matrix $\div$ 2240 = pebble tonnage of bed. This figure, with the chemical analysis and the depth of the overburden, fixes a reasonable commercial valuation. The cost of these determinations is said to have averaged $8 per acre for 2000 acres. Since the pebble plants operate on the basis of an annual capacity of 100,000 tons of marketable rock and cost some $500,000 to build, a minable deposit should have four million tons of phosphate in sight.

All these conditions are quite different in the hard rock field. In the first place, the hard rock territory, though smaller in output, is larger in extent; and the

deposits vary much more than the pebble beds in thickness, in area, in depth from the surface, and in composition. The hard rock formation is typically a gray phosphatic sand in which is loosely imbedded lumps of the hard rock together with boulders of limestone and flint, and patches of clay and soft phosphate rock. The overburden, which averages 30 feet in depth, is chiefly sand. The bed rock is rough, and the resulting irregularity of the matrix together with the unevenness of the deposits make detailed prospecting a necessary precaution.

Hard rock areas are commonly tested by test holes driven from 100 to 200 feet apart for preliminary trials,



A breakdown of phosphate production in the United States indicates the outstanding importance of the Florida deposits. While huge deposits are present in western states, the question of transportation hampers their greater utilization at present.

and the more likely ground is honeycombed at intervals of from 25 to 50 feet. The size and shape of a deposit is thus accurately outlined; but compared with the 16 holes to the 40-acre plot in the pebble field, this method requires (at 50-foot intervals) 676 holes. Two-inch holes are driven by cupping, or if the overburden is hard and rough by means of a chisel bit with a ball valve in a 2-inch casing. In either case drilling may be by man power operating a simple pulley and tripod or by power drillers. Although such prospecting is said to cost about $300 an acre, nevertheless a deposit of as little as 50,000 tons may be opened up, since the hard rock mining operation itself seldom requires an investment of more than $100,000.

In both fields the mining operation consists essentially of two steps: The stripping of the overburden and the removal of the phosphate. Universally the overburden was formerly stripped by pick and shovel and horse scrapers. Later the steam shovel was introduced. Modern practice uses the drag line in the pebble field and hydraulic methods in the hard rock area. The pebble material is now removed by hydraulic mining while dredging is resorted to in the hard rock mines wherever the deposit lies below the ground water level. Both types of material are washed and separated and finally dried.

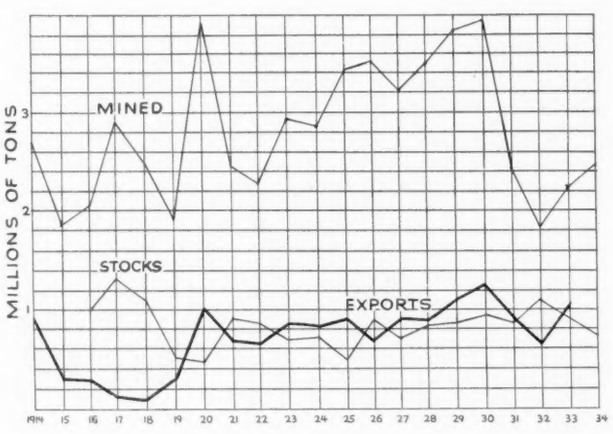
Operations in the Tennessee phosphate mines have adapted a combination of these techniques to their peculiar conditions, characterized by the extreme roughness of the bed-rock, for the phosphatic matrix is buried in grooves and gulleys in sandstone. The drag-line is employed to remove the overburden, and both dredging and dry mining used to get out the phosphate. Some deposits are so badly pocketed in the limestone that pick and shovel are resorted to, and this hand labor is not infrequently used for the final clean-up of a working.

Tennessee blue rock, however, lies in beds which are mined like a seam of coal. Where the bed is horizontal tunnels are driven from which chambers are dug at right angles by drilling and blasting, the phosphate rock being loaded on cars and drawn to the surface. Similar methods are used in the western fields, save that the beds being frequently inclined, stoping is resorted to and the rock, moved by gravity to cars in the main tunnels.

By all these different mining methods extraction of the various forms of rock averages surprisingly close to 20 per cent. of the total material handled. The gravity washer yields a net recovery of from 25 to 55 per cent. of the matrix mined. Great improvement in recovery has been effected since 1929 by flotation, an operation which deeply effects the economics of both the Florida and the Tennessee fields.

Phosphate flotation consists essentially of the following steps. (1) Reduction of the material to the proper particle size (28 mesh or smaller) for froth flotation. (2) De-sliming, a series of washing and settling operations. (3) Correcting the pH to 8.5-9.2 by the addition of an alkali, usually caustic soda. (4) Adding soap-forming reagents, commonly a mixture of fuel oil and oleic acid with pine oil. (5) Successive agitation and aeration to form the phosphate bearing froth which is skimmed off. (6) Recovery of the flotation reagents; washing, and drying the phosphate.

Flotation makes possible a recovery of virtually all



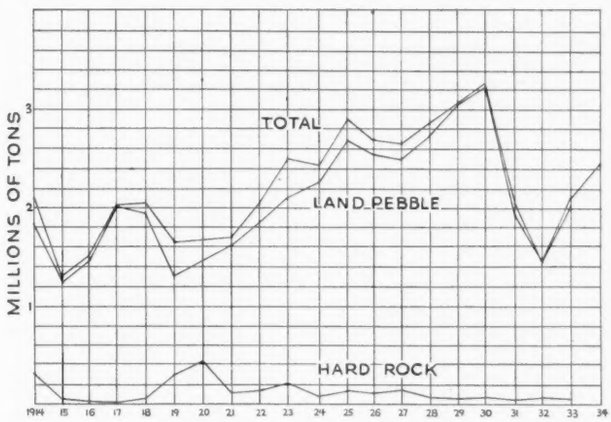
The importance of export business to the phosphate rock producers is graphically shown in this chart; also the trend of production and stocks over a 20-year period.

the phosphate. Moreover, it materially raises the grade of the recovered material. The significant figures have been given by Hendrick* in the data from two runs of a joint washer-flotation operation. The products desig-

* Chemical Markets, Mar. '33, XXXII, 3, p.231.

nated "fine pebble" and "coarse pebble" are washer products, while the designation "concentrates" represents the product from a flotation unit adjacent to the washer and operating on its discarded material.

	First Period	*Second Period*
Duration of period	130.5 hours	120.25 hours
Cubic yards matrix	38,446	33,309
Tons fine pebble recovered	2,881	2,388
Tons coarse pebble recovered	680	612
Total tons pebble	3,561	3,000
Tons flotation concentrate recovered	2,745	2,350
Total tons pebble and concentrate	6,306	5,350
Cu. yds. matrix per ton pebble	10.8	11.10
Cu. yds. matrix per ton pebble and concentrate	6.1	6.2
Tons fine pebble, per hour	22.1	19.8
Tons coarse pebble, per hour	5.2	5.1
Total tons pebble, per hour	27.3	24.9
Total tons concentrate, per hour	21.0	19.5
Total tons pebble and concentrate, per hour	48.3	44.4
Assays		
B. P. L. fine pebble	73.90	72.83
B. P. L. coarse pebble	65.98	68.18
B. P. L. fine and coarse pebble (average)	72.38	71.88
B. P. L. concentrate	75.25	73.18



Relation of Florida land pebble and hard rock production is indicated in this chart. Total production of phosphate in Florida is also shown for the period 1914-34.

In considering the set-up of a mining and washing operation, areas of varying grades and recoveries must always be carefully analyzed, not only for production costs, but for shipping requirements. Without additional recoveries from flotation some washer sites would be uneconomical even though desirable high grades were available. The following figures, also taken from actual operation, illustrate the point:

WASHER ON SITE "A"

Cubic yards matrix per hour	186
Tons phosphate pebble recovered per hour	19.2
Cubic yards matrix per ton pebble	9.6

Tailings from the above washer were sent to a flotation plant which recovered:

Tons concentrate per hour	23.7

The combined operation then is as follows:

Cubic yards matrix per hour	186
Total tons recovered per hour	42.9
Cubic yards matrix per ton recovered	4.3

Using 7¢ per yard matrix as the mining cost, we have:

9.6 yards x 7c (washer only)	67.2c
4.3 yards x 7c (washer plus flotation)	30.1c
Mining saving	37.1c

It is necessary also to remove 8 cubic yards of overburden per ton of regular washer pebble or 3.59 cubic yards per ton of pebble and concentrate combined. Using a cost of 4¢ per yard for overburden, we then have:

8 yards x 4c (per ton washer product)	32c
3.59 yards x 4c (per ton flotation product)	14c
Overburden saving per ton recovered	18c

There is, therefore, a total saving in mining and overburden removal of 37.1¢ plus 18¢, or 55.1¢ per ton of recovered product.

The cost of a modern phosphate washer, together with the necessary mining equipment and drag-line, is about $200,000, while a flotation unit for reclamation of current washer waste or old accumulated debris can be built for $50 per ton per day capacity. A unit of 1500 long tons per 24 hr. will have an output equivalent to that of a washer costing (with auxiliaries) more than twice as much.

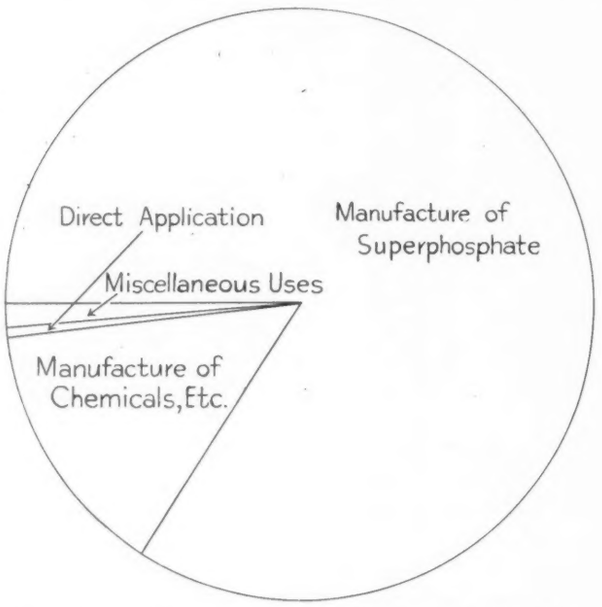
Flotation thus makes it practical both to work lower grade deposits and to re-work dumps. Specifically one area in Florida, having a washer recovery of 500 to 1500 tons per acre, with 30 cubic yards of overburden and 12 cubic yards of matrix to the ton of recovered phosphates, was turned from an uneconomic to a profitable operation by the supplementary use of flotation. This increased recoverable tonnage to 4000 and 8000 tons per acre. In Tennessee, where the practice is to save all the granular phosphate possible, flotation raises the grade from a washer average of 68-70 per cent. to 77 per cent.

Although from the chemical point of view of employing phosphate rock most efficiently, we are looking upon it realistically as calcium fluorphosphate, still commercially it is considered simply upon the basis of its content of tricalcium phosphate ($Ca_3P_2O_8$), also called bone phosphate of lime (B. P. L.). The market demands that the iron and alumina content shall be below recognized limits, and prices are based upon both the B. P. L. content and the percentage of these impurities.

In recent years there has been an increasing demand from both foreign and domestic buyers for higher grades and a growing discrimination in buying on analysis. Florida hard rock, for example, is sold for export on a contract basis of 77% B. P. L. with 25¢ pro rata unit rise over 77% and with 50¢ pro rata unit fall down to 75%, the guaranteed minimum. When the iron and alumina combined content is guaranteed, all buyers insist, and most sellers agree, that whenever the I. & A. exceed the guarantee two units of B. P. L. are to be subtracted from the analysis, and if this subtraction brings the B. P. L. below the guarantee for that material, a penalty of from 15 to 50¢ per unit per ton is to be exacted. Contrariwise, sellers insist and buyers are more and more willing to agree that when the analysis shows less I. & A. than the guaranteed maximum, that one unit of B. P. L. shall be added to

the analysis result for each unit of the decreased I. & A., and that should this corrected B. P. L. result be above the guarantee for that material, the buyer will pay an agreed premium of from 15 to 25¢ per unit per ton.

The sale upon analysis with penalties and premiums requires caution in accepting at their face value average price quotations. When 77% grade sells at $7 a ton the price of 79% should be corrected to $7.50 and that of 75% to $6.00, while a 65% material will bring only $3.25. Prices for Florida hard rock, 77% grade, have ranged all the way from $7.50 to $15 a ton f. o. b.



A breakdown of the principal uses of phosphate rock for the year 1933 is shown, and indicates clearly the huge tonnage employed in superphosphate production.

For export the demand has always been for a material analyzing 75% or better. This is partly due to freight costs, but also because European fertilizer makers demand a superphosphate with 18% soluble acid phosphate. So long as American practice required only a 14-16% acid phosphate, domestic buyers accepted rock of from 60-70% B. P. L. Improvements in our technique of superphosphate manufacture and the stepping up of mixed fertilizer formulas, have created a domestic demand for the higher grade of rock. Against this tendency is the blast and electric furnace use of phosphate, employing a lower grade material with silica. Nevertheless, all buyers are more and more interested in the chemical composition of their phosphate supplies, although analyses by Marshall, Rader, and Jacobs* of phosphates from widely separated sources reveal astonishing chemical consistency, as shown below.

Growing demand for high grade material stimulates flotation recovery and serves to stabilize the Florida hard rock industry, while the furnace operations have been distinctly favorable to the Tennessee area. Most of the output of both fields is shipped to the fertilizer plants within their natural trade territories. Florida ships land pebble chiefly from Tampa by rail and boat to Charleston, Norfolk, Baltimore, Carteret, N. J., and Harvey, La. Hard rock is exported to Europe from Fernandina, Jacksonville, and Tampa. The Tennessee market is the inland fertilizer factories of the South and the Middle West and the furnaces of Alabama and Tennessee. Most of the rock from the Utah-Idaho-Montana mines goes to San Francisco, small quantities to St. Louis and Chicago, and sporatic exports to Hawaii and Japan. The domestic market has not felt, to any serious degree, the repercussions of the changing world market; but the impact of technological changes is direct and already noticeable.

Three out of four tons of our total phosphate rock production is acidulated to make superphosphate. The operation consists in grinding the raw rock to 60-80 mesh fineness and mixing it mechanically with an equal weight of 50° Bé sulfuric acid in batches of from one to two tons. After stirring, the muddy mass is dumped into a so-called den where the reaction continues. After twenty-four hours the batch is dug out and stored in great piles and cured from three weeks to two months when the mass must again be broken up and pulverized. The finished product contains 14-16 per cent. available P_2O_5 and is used chiefly as an ingredient in complete fertilizers.

An improved process is the "Oberphos" method in which acid and rock, in the ratio of four to five parts, are forced by air pressure into a steam-heated, rotating autoclave, sealed so that the heat and gases evolved carry forward the reaction under pressure and at higher temperatures. When the reaction is complete the pressure is removed, and after vacuum drying, the superphosphate removed in the form of small, porous balls which are easily crushed. The process saves acid. It produces a finished product within 48 hours. That

* Ind. & Eng. Chem., Nov. '33; XXV, 11, p.1253.

CHEMICAL COMPOSITION OF NATURAL PHOSPHATES

(Results on air-dry basis)

Type or Source of Phosphate	Location of Deposit	P_2O %	CaO %	Al_2O_3 %	Fe_2O_3[a] %	SiO_2[b] %	CO %	F %	SO_3[c] %	H_2O at 105° C. %
Florida land pebble No. 1	Mulberry	31.14	46.25	1.16	2.57	7.23	3.74	3.91	0.97	0.67
Florida land pebble No. 2	Mulberry	35.86	48.73	1.09	0.70	7.43	1.47	3.90	0.20	0.70
Florida land pebble No. 3	Unknown	31.80	47.97	0.99	1.62	7.07	3.61	3.93	1.19	0.42
Tennessee brown rock No. 1	Wales	34.46	47.48	1.21	3.40	7.09	1.31	3.75	0.61	0.80
Tennessee brown rock No. 2	Mount Pleasant	34.41	48.47	1.22	2.51	5.89	1.96	3.79	0.70	0.43
Tennessee blue rock	Gordonsburg	31.84	45.15	1.28	3.40	9.09	2.59	3.77	1.26[d]	0.46
Idaho	Conda	32.95	46.06	1.15	0.86	6.84	1.70	3.30	1.72	1.14
Wyoming	Cokeville	30.10	46.09	1.36	0.87	7.17	4.12	3.53	1.35[e]	0.35
Montana	Garrison	36.32	50.26	0.57	0.56	4.10	0.93	4.01	...	0.42
Curaçao Island	Dutch West Indies	37.86	50.00	0.40	0.61	0.48	3.88	0.70	0.61	0.76
Fluorapatite	Quebec Province, Canada	37.66	48.97	...	...	...	1.41	3.05	...	0.05
Steamed bone meal	.....	35.23	46.68	...	...	...	...	...	...	0.16
Bone ash	.....	40.46	54.18	...	...	...	0.70	0.05	...	0.18

[a] Total iron.
[b] Total SiO_2.
[c] Total sulfates.
[d] Also contained 2.08 per cent. sulfur as pyrite.
[e] Also contained 0.52 per cent. sulfur as pyrite.

product is higher in P_2O_5 content and is also granular in form and so does not cake.

Even more widely adapted has been the practice of treating superphosphate, cured in the usual manner, with ammonia. This is accomplished by (1) spraying with ammonia liquor, (2) exposing to the action of ammonia gas, (3) treating with a solution of urea in ammonia liquor. By the first two methods some 3.5 per cent. of ammonia in the form of ammonium phosphate and ammonium sulfate is added. The free acidity is greatly reduced. The physical condition of the ammoniated superphosphate is much improved by reducing the moisture, thus preventing setting and making for easy, uniform distribution through the fertilizer drill.

The so-called triple-superphosphate and dicalcium phosphate, made by acidulating with phosphoric and muriatic acids respectively, are used each year in larger quantities by the fertilizer trades; but even combined they represent still but a small fraction of the 90 per cent. of phosphates that are used in various forms as plant food. In fact, the growth of the direct application of very finely ground, untreated rock has been quite as significant as these newer chemical forms. Of the strictly chemical uses of phosphate rock, elemental phosphorus is used in match heads, in the striking surface of safety match boxes, in vermin poisons, in medicine, and in fireworks, an application that is modified in modern munitions making in tracer bullets, range-finding shells, smoke screens, and incendiary shells. From ortho-phosphoric acid, which is the only phosphoric acid of great importance, are made the sodium and calcium salts. Of the former the tricalcium phosphate is most widely used as a cleaning and water-softening compound. The monocalcium salt is consumed in large quantities in baking powder and in sugar refining and yeast cultivation.

Phosphate Rock Prices (At Mines)
(Average for Year)

	All Grades	Florida Hard Rock	Florida Land Pebble
1916	$2.75	$ $.26	$2.64
1917	2.70	5.93	2.65
1918	2.95	6.08	2.79
1919	4.70	8.59	3.79
1920	5.78	11.31	4.99
1921	5.86	10.28	5.38
1922	4.05	6.96	3.76
1923	3.56	5.37	3.40
1924	3.30	4.40	3.23
1925	3.00	4.12	2.93
1926	3.21	4.00	3.17
1927	3.28	4.00	3.24
1928	3.27	4.00	3.24
1929	3.21	3.69	3.19 (1)
1930	3.32	6.33	3.24 (1)
1931	3.49	6.65	3.39
1932	3.25	6.48	3.13
1933	3.00	6.63	2.91

(1) Contains soft rock prices also.

Among the minor salts of the various forms of phosphoric acid monoammonium phosphate is used in yeast culture, fireproofing, food products, and impregnating match stems to prevent afterglow. Sodium ammonium phosphate is also used in fireproofing mixtures. Monopotassium phosphate is used in baking powders, yeast culture, and photography. Both dipotassium and tripotassium phosphate are used in photography. Aluminum phosphate is used in silicate dental cements. Barium, sodium, and calcium phosphates are used in glass making. Many metallic phosphates are used in coloring for hard porcelain and clays. Small quantities of phosphates of silver, uranium, manganese, barium, and vanadium have been used in photography.

In conclusion it should be remembered that phosphate rock is our commercial fluorine. With the introduction of fluosilicates as insecticides and di-fluo-diethyl methane as a refrigerant, this element's industrial employment has enlarged.

Industry's Bookshelf

Must the Nation Plan? by Benson Y. Landis, 211 p. Association Press. $2.

Supposed to be a mental springboard for those who would plunge into debate over the New Deal, but slanted a bit too far to give a fair start. Nevertheless, if you like to do your own digging for facts, there are questions and references that will keep your secretary busy all during your vacation.

Ancient Egyptian Materials and Industries, by A. Lucas, 447 p. Edward Arnold (London). 16s.

An extremely complete and valuable account of the greatest interest to any chemical man, which is an enlarged second edition of a book first published in 1896, brought up to date with the latest discoveries of archaeology and analysis. The Egyptians employed chemical process to an amazing extent and, in the light of our chemical understanding of the problems they solved, their accomplishments were of a high order. The author knows his subject, and presents it with a rare combination of charm and precision.

Dust, by S. Cyril Blacktin, 296 p. Sherwood Press, Cleveland, Ohio. $6.50.

Dust has been called industrial enemy No. 1, and quite aptly, for the total damage wrought by dust undoubtedly exceeds that due to any other destructive agent, not excluding corrosion. Nevertheless, the study of dust has been considerably neglected, and no book has hitherto been available on the subject. Dr. Blacktin has sought to supply the need for a comprehensive monograph on dust, and has written an exceedingly useful treatise. The scope includes every aspect of dust, and his book will be valued for the bibliography alone, which lists more than 500 references. "Dust" is recommended to works managers, industrial physicians, health authorities, and all who have to deal with the dust problem in manufacturing, science, and disease.

Abstracts of Literature on the Manufacture and Distribution of Ice Cream. Vol. V, 1931-1933. 118 + XIV p. International Association of Ice Cream Manufacturers, Washington. $5.

Since 1927, this Association has maintained an abstracting service for the benefit of its members, edited by A. C. Dahlberg, with the cooperation of the Research Committee of the Association. No where else can information on ice cream be found in such easily usable form. In addition to manufacturing and distribution, the basic sciences are thoroughly covered. These abstracts should be in every library having contact with this industry.

Governmental Policies and Chemical Prices

By E. M. Allen

President, Mathieson Alkali Works

MAKING an experimental laboratory of our great country, and its effect on our 125,000,000 citizens, is a serious and grave responsibility, and I am very glad to see, today, increasing and definite signs that the country is really awakening to what has been done, and what is being done to our very existence. This shows that our people are beginning to think, and are changing from their state of apathy.

Reciprocal trade treaties, being negotiated by the present Administration, are upsetting to all industrial and commercial organizations, as American industries are faced with an attempt to barter certain products they sell, through treaties with foreign countries. These treaties—if consummated—will force American industry to compete with the prices of foreign products, and firms engaged in the manufacture and sale of such affected lines must be prepared to adjust their prices accordingly, or give up that line of business.

The Work Relief Plan, a movement actuated by immature plans, devised by inexperienced and impractical proponents, makes one wonder what the Government would encounter if it had been compelled to get a permit from the Securities Exchange Commission to raise $4,880,000,000, based on the immature plans as set forth. Any one with experience can tell you that the Government's application, under such conditions, would be turned down flat, and subjected to a most scathing refusal.

NRA and the AAA, two of the outstanding experiments, are two of the most costly and ghastly failures that the country has had to endure. You all know what they have done to you, what they have done to Labor, Agriculture and Capital, in fact, what they have done to our very national life—and the returns have only started to come in.

NRA was planned and launched by men, many of whom were thought to have legally trained minds. I am informed that the man who had most to do with its organization, acknowledged at the beginning that the act was unconstitutional, hence all codes were so handled as to appear voluntary—one of the main inducements held out to Industry being that by joining the movement Industry could then legally work out fair trade practices and fair prices for their products. I am glad to say that the Chemical Code had no price fixing clauses, and specifically stated that its members waived none of their constitutional rights in the signing of the Code of Fair Competition for the Chemical Manufacturing Industry, as most of its members' attorneys were certain that the act itself was unconstitutional.

Heavy chemicals primarily embrace alkalies and industrial acids, and this address is directed towards a brief review of the situation of this group, their trends and their possible position in the immediate and distant future.

Recovery in this field is far from being fully realized, and the raw materials and labor costs have been advancing much more rapidly than the selling prices, but that there must be an advance in the near future is apparent to those who have access to and a knowledge of the ever-increasing costs due to NRA, processing taxes, etc.

In this connection we find that at the end of 1934, as compared to the beginning of 1933, labor and raw material costs have shown a material advance, as evidenced by the following increases: phosphate rock, 3-5 per cent; bauxite 30-50 per cent.; fuel oil, 40-60 per cent.; coal, 100-150 per cent.; labor, 20-30 per cent.; salt, 2-5 per cent.

Shipping containers used in the heavy chemicals industry compared for the same periods show the following approximate increases: barrels, 30-40 per cent.; steel drums, 10-15 per cent.; burlap bags, 7½-15 per cent.

These increases in labor rates were compiled by the Bureau of Labor Statistics of the Department of Labor. Increases in costs of raw materials are from records of certain large manufacturers, and other reliable sources.

Many changes are taking place in the consumption of Heavy Chemicals, and all manufacturers should forecast ahead, due to changing processes of manufacture and new processes developed by users. For example, the petroleum industry sulfuric acid consumption shows a decline of approximately 23 per cent. in 1934 as against 1930, per barrel crude treated, due mainly to partial substitution of solvent extraction plants for petroleum processes, whereas sulfuric acid was formerly used. In this same industry, caustic soda consumption, per barrel product treated, has decreased, due to changing and improved practices, as well as a change in purity of crude treated.

Chemicals mostly come under the heading "Consumers Goods," as compared say to products like steel, etc., which come under the heading of "Capital Goods." So that instead of using as a commercial barometer the prices of "Scrap Steel," which up to 1922 was the best barometer of general business, today I think that the data and statistics relative to sulfuric acid is the very best barometer of general business, and will be for many years to come.

The figures on the distribution of soda ash and caustic soda in that order, next to sulfuric acid, are the next best barometers, being so universally used.

SHARPLES INDUSTRIAL AMYL COMPOUNDS

*Pentasol (Pure Amyl Alcohol)
*Pent-acetate
*Pentaphen (Para-Tertiary Amyl Phenol)
Monoamylamine
Diamylamine
Triamylamine
Amyl Mercaptan
Diamyl Sulphide
Normal Butyl Carbinol
Iso-Butyl Carbinol
Secondary Butyl Carbinol
Methyl Propyl Carbinol
Diethyl Carbinol
Dimethyl Ethyl Carbinol
Normal Amyl Chloride
Mixed Amyl Chlorides
Amyl Benzene
Amyl Naphthalene
Dichloro Pentanes
Diamylene
Diamyl Ether

*Trade Mark Registered

The amyl radical represents more than just another alkyl group. Its introduction into various compounds has been found to impart decided advantages. To be specific, higher yields in ore flotation—better oil solubility in resins and organic soaps—and in dyestuffs, not only oil solubility but more desirable shades—are just a few of the outstanding examples.

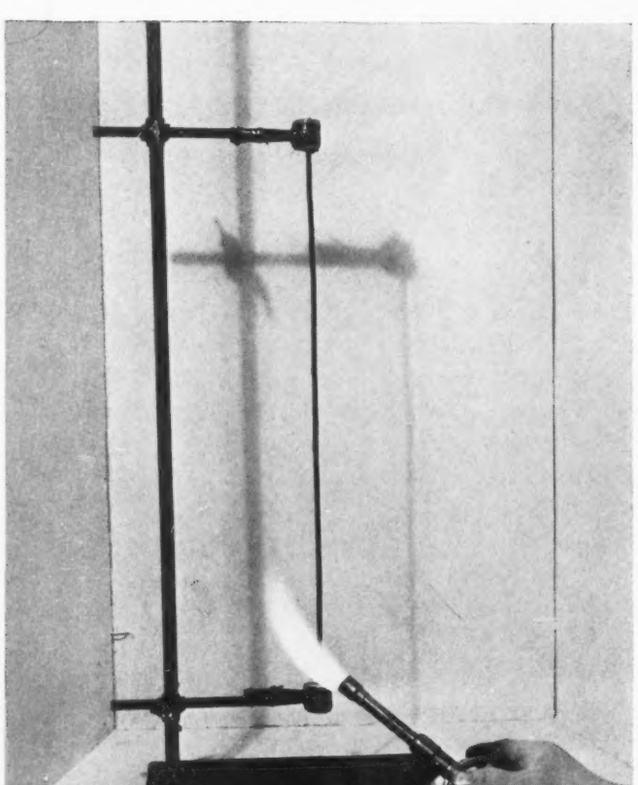
Among these Sharples Amyl Compounds, the research chemist may find a more satisfactory raw material for the product or process he may be developing. Consult with our research department—to secure working samples or technical reports.

THE SHARPLES SOLVENTS CORP., 2301 WESTMORELAND ST., PHILA., PA.

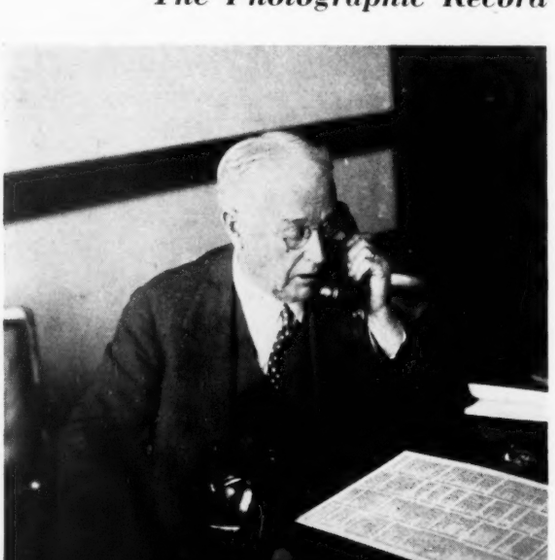
SHARPLES SOLVENTS

CHEMICAL

The Photographic Record



Test tubes are not the only way of testing chemicals nowadays. Here is a test recently devised and being used by Monsanto Chemical Company to measure inflammability of various materials treated with sundry flame retarding chemical agents. Photograph taken in Underwriters Laboratory.



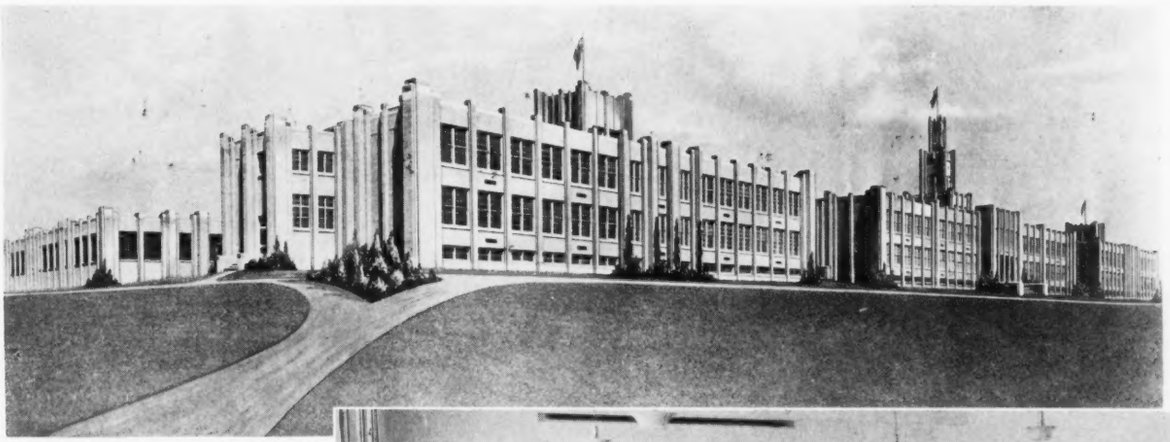
A candid photograph of James T. Pardee, recently elected Chairman of the Board of the Dow Chemical Company.

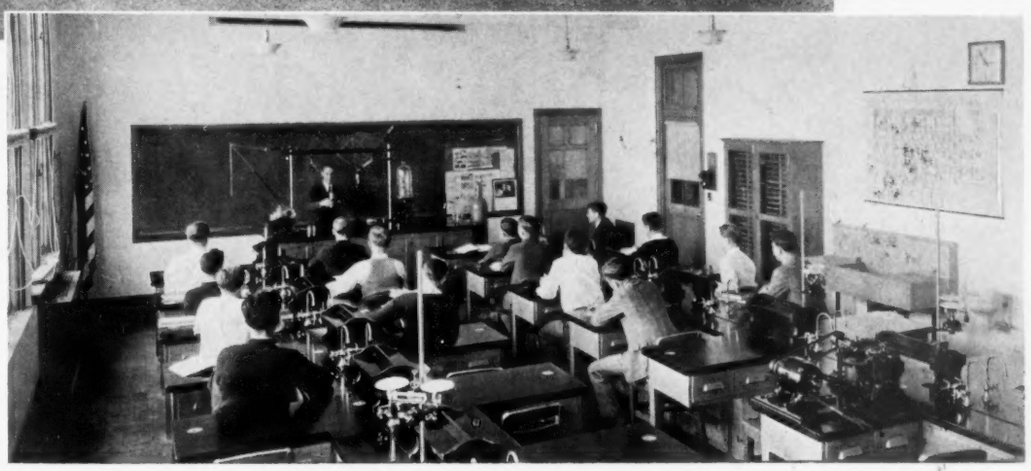
A photograph taken a quarter of a century ago, June 15, 1909, of the Manufacturing Chemists' Association of the United States, when they held their annual meeting at Marblehead, Mass. In this group standing, left to right, are: Frank B. Bower (Henry Bower Chemical); Harry C. Grant (Grasselli); Mr. Heritage (Charles Lennig & Co.), W. C. Webber (Cochran Chemical); C. M. Butterworth (Penn. Salt); W. H. Nichols, Jr. (General Chemical); S. W. Wilder (Merrimac); Allen H. Claflin (Avery Chemical); T. S. Grasselli

NEWS REEL

of Our Chemical Activities

In keeping with modern educational methods the directors of the Hershey Industrial High School at Hershey, Pa., have installed a modern chemistry class-room. Here, the orphan boys, who receive their education, may learn the mysteries of this science, which at the time they enter the business world will, without question, be far more important than even today. This group of buildings was the gift of M. S. Hershey.





*(Grasselli); Lindsley Loring (Merrimac); W. H. Bowcr (Henry Bowcr Chemical); "Doc" Havens (Harrison Bro.); C. Wilbur Miller (Davison Chemical); *; E. R. Grasselli (Grasselli). Seated, left to right: George R. Bowcr (Henry Bowcr Chemical); *; Arthur Rice (Penn. Salt); Louis I. Waldman (Hudson River Aniline); F. R. Hazard (Solvay); Henry Howard (Merrimac); Herman A. Metz (Consolidated Color); *; *; Henry Glover (Powers & Weightman); A. G. Rosengarten (Rosengarten & Sons); Lemuel Howe (Howe-Balch).*

** indicates unidentified members.*

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INTERMEDIATES

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NITROBENZENE	NITROTOLUENES
BETA NAPHTHOL	PARANITRANILINE
DIMETHYLANILINE	PARAPHENYLENEDIAMINE
DINITROBENZENE	PICRAMATE OF SODA
ANTHRAQUINONE	SULPHANILIC ACID

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New Products and Processes

A Digest of the Current Literature for the User of Chemicals

Water Soluble Resins

By E. Rosendahl

Glyco Products Co., Inc.

Resins or resinous products completely soluble in water have many applications in a wide variety of fields, and a study of some of these uses may indicate further applications. Glycol bori-borate, a boric acid derivative of diethylene glycol, is a sticky, non-drying, light amber colored product completely soluble in water, glycerin, glycols, methanol and anhydrous ethyl alcohol, but insoluble in oils and hydrocarbon solvents. On prolonged heating above 275° F. it loses molecularly combined water and on cooling forms a hard "glass" which is very hygroscopic.

While oils, minerals, sulfonated or emulsified, are the basis of most textile lubrication today, they suffer from the defects of their individual properties. Glycol bori-borate, however, is completely soluble in cold water and therefore very easy to remove from the fibre. It is hygroscopic so that any tendency to drying out is eliminated. It restores to the fibre the waxy feel which has been removed by the dye assistants without leaving any gumminess or "tack." Finally it is odorless and non-oxidizable so that ageing produces no deleterious effects.

Applications of Glycol Bori-Borate

The use of glycol bori-borate is not confined to the textile field. Its hygroscopic and non-drying properties have given the adhesive manufacturers a material which can control the speed and tack of glues, gelatine, and other water soluble adhesives to a point where fine adjustments can be made for special types of work. The following formula illustrates its use for Cellophane adhesion:

Animal Glue	18 lbs.
Water	18 lbs.
Preservative	1 oz.
Glycol bori-borate (liquid)	9 lbs.

The glue is soaked in the water in which the preservative has previously been dissolved. When the glue is thoroughly dispersed the glycol bori-borate is added and the whole is stirred until complete mixture is obtained. If the glycol bori-borate content is doubled a tacky material is obtained which gives a very flexible bond.

Mild astringent lotions and hair setting preparations are both improved by the incorporation of small amounts of glycol bori-borate. Another use, of considerable importance in a number of industries, is in the prevention of caking of pigments in water dispersions. White shoe dressings, for example, very often have a hard cake of pigment settling at the bottom of the bottle which it is almost impossible to dislodge, even after prolonged shaking. The incorporation of a small percentage of glycol bori-borate will prevent this caking so the pigment can easily be redispersed by simple shaking.

Recently, a new type of water soluble resinous material has been commercially produced. This type is completely inorganic and while similar in many properties to the organic water soluble resins has a number of other features which enable it to be used where the water soluble resins of the organic type are unsuitable.

Stacol, the name of this inorganic resin, is a complex sodium boro phosphate. It is a neutral transparent water-white glass-like product completely soluble in all proportions in water giving solutions of low viscosity even in concentrations of 75 per cent. These water solutions are stable to both acids and alkalies, and the resin is not precipitated out except on the addition of concentrated mineral acids or salts of the heavy metals.

Stacol melts at 48° C. forming a heavy viscous syrup. The viscosity remains high up to about 115° C. when crystallization takes place. On further heating at elevated temperatures it forms a glaze. It is insoluble in organic solvents and oils but glycerin and the glycols can be added to water solutions in all proportions. The addition of small percentages of these materials increases the flexibility of Stacol films.

Stacol Solutions for Coating Purposes

Stacol solutions in water have a high surface tension and low penetration. This feature makes it of interest for coating purposes where penetration is an undesirable feature. However, the addition of small percentages of the newer types of penetrating agents such as the sodium salts of the sulfated fatty alcohols decreases the surface tension so that penetration can be controlled almost at will.

Because of its neutrality and high surface tension, it is an interesting coating material for paper and similar products, as no discoloration is evidenced, as in the case with alkaline finishing materials.

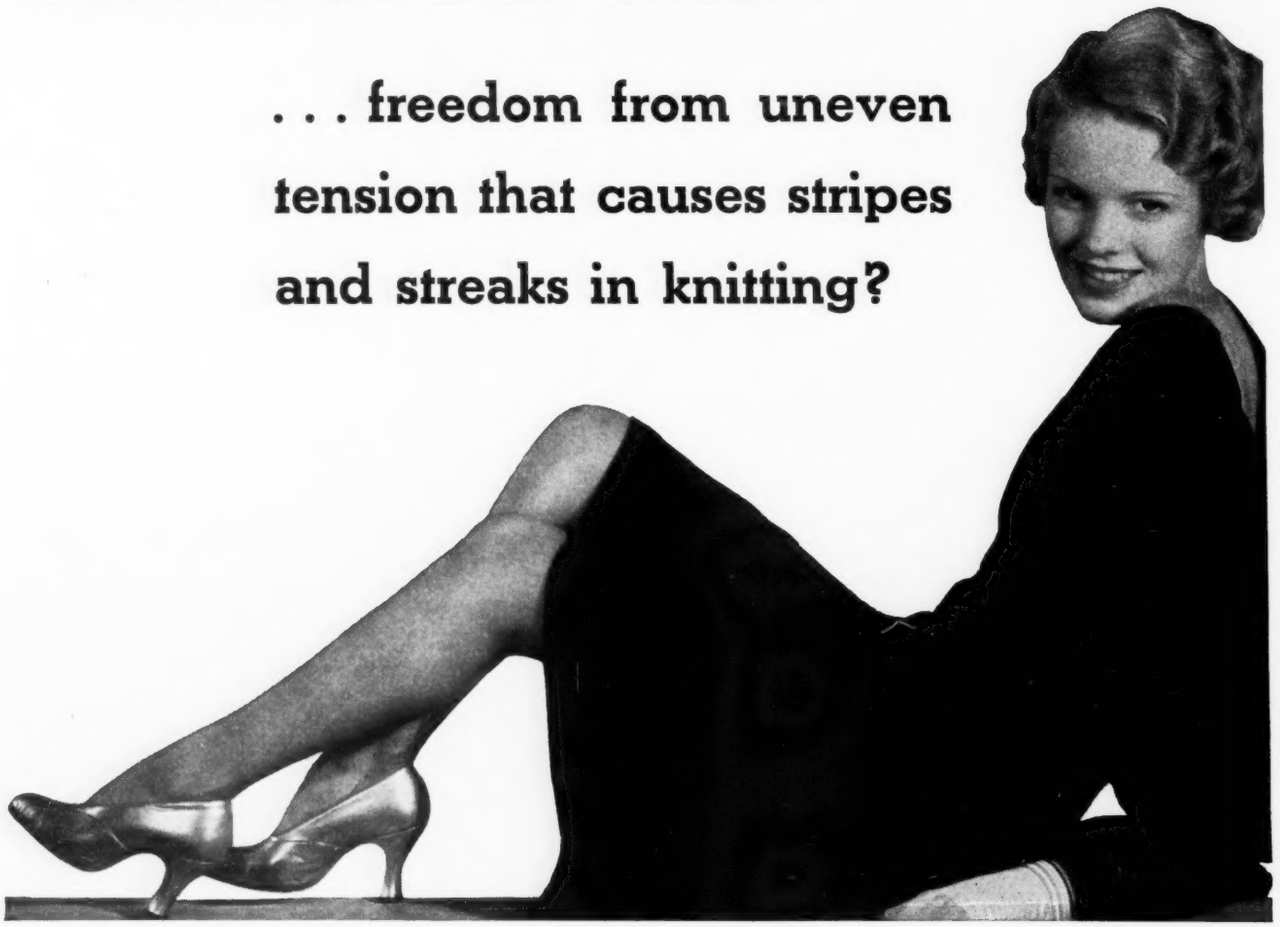
In the lacquer industry, expecially for wood finishes, the selection of the correct type of sealers and primers has long been a problem to manufacturers. Cheap sealers cause grain raising and give poor anchorage for the finishing coats. The more expensive type can only be used for the highest grade of work. Stacol, because of its high surface tension, causes the minimum amount of grain raising. Furthermore, both nitrocellulose and cellulose acetate lacquers adhere readily and firmly to Stacol films.

As has been mentioned previously, the high surface tension of Stacol solutions can be reduced considerably by the addition of small percentages of penetrating agents. A 25 per cent. solution so treated makes an excellent impregnating material for paper, cardboard, textiles and similar fibrous materials. This impregnation not only imparts stiffness and weight to the finished product, but also makes it fireproof to a considerable degree. In this respect, because the film is continuous, better protection is afforded than when crystalline salts are used.

Considerable work still remains to be done in the water soluble resin field, but it is hoped that this article will call attention to a class of compounds capable of wide application in many branches of the industry.

ISN'T THIS WHAT YOU'RE AFTER?

. . . freedom from uneven tension that causes stripes and streaks in knitting?



ARE you using old-fashioned formulas in soaking silk for three-carrier work? Let us tell you about our proved development—a direct knitting formula for running the yarn from cone to hose.

The yarn made from our formula hugs the cone to exactly the right degree of tension and will run free enough to give a greater number of first-grade finished hose.

Try our SOLUBLE SILK OIL W-814 for soaking silk and SOLUBLE OIL W-530 for throwing rayon.

For boiling-off silk hosiery — our BOIL-OFF OIL No. 1 CONC. and BOIL-OFF OIL S-389 (non-silicate).

For scouring rayon—WOLFCO SOLVENT—gives good clean base for dyeing.

MONOPOLE OIL added to the dyebath acts as a dye penetrant, leveller, and as a finishing agent.

ELEMITE is effectively used where only hard water is available.

HOSIERY FINISH No. 300 and W-686 give body, stiffness and make hose lie flat in box.

DULL FINISH W-716 (paste) and S-342B (powder) are delustres that do not stiffen or dust off.

JACQUES WOLF & CO.

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Glass

"Misco" is a new development in wire glass, announced by the Mississippi Glass Company. A striking feature is that each intersection of wire is welded electrically, which promotes the appearance of the glass, but does not retard from its efficiency, as it has been approved as a fire retardant. The welding at the juncture of the new rectangular mesh permits glazing, either horizontally or vertically.

Heat-Absorbing Glass

This glass, known as "Coolite," is blue-green in color, and absorbs much more heat than standard ribbed glass, transmitting only 20 per cent. of the illumination. Mississippi Glass Company, manufacturers, claim that it has been found to transmit but 27 per cent. of the solar infra-red (heat) rays while transmitting 68 per cent. of the solar light. It is expected this glass will find rapid adaptation in places where there is much sunshine. Its use is suggested in the new forms of air conditioning and heating.

Ceramics

Results of a detailed study on the use of hydrochloric acid in the prevention of cracking of clay products during drying are described by H. H. Macey, in a paper to the Yorkshire Section of the British S. C. I. The author stated that the effect of the acid on clay varies enormously from clay to clay. In some cases, the acid prevents cracking to a large degree; in others, the effect is very small. However, a sedimentation test has been worked out which gives definite indication as to whether the clay will respond favorably to acid treatment; also as to the amount of acid required. The action of the acid appears to be due to the opening up of the water channels in the plastic body.

Enamel Frit

A problem facing manufacturers of porcelain enameled signs is being solved in the Clear Acid Resisting Frit No. 924 developed by the O. Hommel Company, 209 Fourth Ave., Pittsburgh, Pa. It may be applied over colored porcelain enameled signs. Being clear as the finest transparent glass it allows the colors to reach the eye in all their shiny brilliance. Because of its strong acid resisting qualities it protects these colors from the ravages of weather, particularly in industrial localities where the atmosphere is laden with acid forming gases and chemicals. It is said to be more acid resisting than any commercial frit so far tested.

Rubber

Eel-slip is a vulcanized composition of asbestos, graphite, and rubber, developed by Johns-Manville as a bearing material for service under water. It is a tough but readily machined product of low coefficient of friction, and fills a long felt need for a bearing material which does not require use of commonly used oil lubricants; water being its best lubricant. This product is of especially good service where great mechanical strength is needed and the service is severe.

Latex Insulated Wire

In the simplest manufacturing process for preparing latex wire, the conductor is led into a container holding a properly purified and compounded latex and is then passed upwards in a vertical direction into a drying chamber where the latex is heat coagulated. Then it is brought down into another bath of latex compound and subsequently passed vertically into further drying chambers. This process is continued until the desired thickness of rubber is obtained on the conductor. The latex compound may be either vulcanized or unvulcanized. J. McGavack, in a paper to the A. C. S., lists the following advantages for this latex coating: (a) Thinner wall of insulation to obtain the same equivalent electrical result. (b) Lesser amount of compound used to obtain the same equivalent electrical result. (c) A considerable reduction in weight for the same length of insulated conductor. (d) Reduced cost in any braiding or covering of this insulated conductor.

Rubber-Wrapped Merchandise

A process for a non-inflammable liquid protective coating, soon to be in the market, holds promise of seriously competing with present merchandise wrappings. Kelsanite, as the new product will be trade-marked, can be handled like paint; with a brush, sprayed on, or articles dipped in it. On exposure to air, it turns into live rubber but a few minutes after application. It adheres to any surface, forming a complete protective coating, but is easily removable. A dominant advantage is that the article to which it is to be applied does not have to be completely clean and dry.

New Rubber Anti-Oxidant

Agerite Syrup, described as being a ketone-amine reaction product, having a low sp. gr. of 1.03 (1 gal. weighs 8.6 lbs.), is being marketed by R. T. Vanderbilt Co. Its chief characteristics are: Good flex-cracking properties, good ageing quality to rubber compounds, and it may be used up to 3% without danger of blooming. A syrupy anti-oxidant is easier to incorporate with rubber, and has a mold softening effect which aids the mixing and processing of difficult stocks. New product is uniform and stable, but is not recommended for white or delicately colored stocks as it has a tendency to stain and discolor when exposed to light.

Textiles

New additions to the Du Pont line of leather, printing and acetate colors include: Du Pont Leather Brown ER and Du Pont Leather Brown Y, two important additions to the line of acid colors for use on leather as they produce medium shades of brown without the use of dulling agents. They are of general interest in the surface dyeing of leather, possessing satisfactory application and fastness properties.

An entirely new stabilized Azoic dyestuff added to the range of printing colors for cotton is Diagen Dark Brown AR. It is a deep shade of brown, especially adaptable as a base for the production of various dark brown shades.

The division is placing on the market Leucosol Black BBD Double Paste, a vat color of good tinctorial strength especially prepared for printing, which will be of value for use on cotton and rayon materials in shades ranging from light grays to deep jet blacks. The working qualities are extremely good, as it is non-foaming and grit-free, and it does not dry out or form crusts in the barrels. Fastness to light, washing and chlorine are good. Lithosol Acid TOBF is a new offering, intermediate in shade between Lithosol Acid TOB and Lithosol Acid TOBW, being yellower than the former and bluer than the latter. It is handled and converted to the barium or calcium salt in the same manner as Lithosol Acid TOB, and its addition facilitates the matching of standards for lithol manufacturers.

A new textile delusterant is now on the market under the name of Neotone T. It is designed particularly for application to rayon, but is equally satisfactory on silk, cotton and acetate fiber materials. Produces a washfast and dry-cleaning-fast dull finish. Being firmly attached to the fiber, it does not dust out when the fabric is torn nor does it rub off and will withstand at least five or more washings in 0.5 per cent. soap at 120° F. Does not contain any sulfonated vegetable oils and the finish is not liable to rancidity.

"Acele" Diazo Black ASN is a new developed acetate fiber

Perchloron

SUPER-TEST CALCIUM HYPOCHLORITE

Exceptionally high Chlorine content . . No return containers to bother with . . Requires less storage space . . Exceptionally stable . . Rate of decomposition less than 3% a year.

TESTS 70% PLUS

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dye which yields green shades of black on all types of acetate fiber materials. It possesses the property of exhausting well at temperatures of 160° F. or less, and is particularly suitable for dyeing plushes and similar material where low temperatures are required, as well as acetate taffetas, satins and lining materials.

General Dyestuff released the following this month: Stilbene Yellow G A Conc., a direct color for dyeing cotton or rayon, which stains wool or silk but very slightly from a neutral bath and leaves acetate silk clear. Benzo Fast Heliotrope 2 R L A, a direct dyestuff giving bright shades of helio on rayon and cotton, and somewhat redder shades on silk. Wool Fast Blue FFGA, a new acid dyeing blue manufactured by General Aniline, is distinguished by its bright, greenish blue shade, which does not turn red under artificial light. Shade is only slightly dulled by chrome. It exhausts well from a neutral bath and has good affinity for pure and tin weighted silk. Acid Alizarine Blue Green L is a chrome-topped color of the I. G. range. Dyed from a weak acid bath and after-treated with bichromate, it produces bluish greens of very good fastness to light, fulling, and decatizing. Is also excellent in fastness to washing, sea water, and perspiration. A special advantage is that it keeps its shade well under artificial light. Indanthren Navy Blue BF Powder Fine for Dyeing, a new Vat Navy Blue manufactured by the I. G., is slightly greener and brighter than Indanthren Navy Blue BF and is less sensitive to varying dyeing temperatures. Because of its good fastness properties it is suitable for producing fast dyeings on cotton, rayon, and other vegetable fibers. Rapidogen Orange R, a reddish orange of very good fastness to light, washing, and chlorine, which retains its shade in continued soaping.

Air-Dried Gelatine

The substance of a paper by S. E. Sheppard and J. H. Hudson, presented to the ACS, is the preparation of air-dried gelatin, said to have definite advantages both in processing and in the properties of the finished material. The authors have foamed and dried gelatin solutions from 3 to 20 per cent. concentration. At not too high concentrations pressed foam gelatin dissolves in water much more rapidly than sheet or flake gelatin. Its water absorption is greater, and the distention of the air-cells accelerates the swelling and peptization. It peptizes rapidly at temperatures above 40° C. Process of obtaining a foam or crepe is described, and the advantages of the compressed product taken up.

Miscellaneous

Recent studies of spray painting operations prove that as much as 90 per cent. of the waste spray is caught by the baffles. Experts of the N. Y. Industrial Commission claim that the best method of keeping the baffle plates clean is to spray the whole interior of the booth where the spray painting is done, before using, with a liquid soap which will dry but not harden. This causes a membrane of soap between the metal wall of the booth and the deposited paint. The waste paint and soap may then be easily cleaned off with a wooden scraper.

Phosphorescent Varnish

An automobile being exhibited in France, has a body finish of varnish which contains a phosphorescent substance which makes the car glow at night.

Plastics

For molded plastic parts requiring sanding or machining operations and subsequent re-polishing, General Plastics announces a new Durez material, 114 SB black. This new material has a greater depth of color, and a peculiar make-up which permits subsequent polishing to a soft, rich, satiny lustre even after complete grinding off of the natural surface. It has a flexural strength of 10,000 P.S.I. and compressive strength of 28,000 P.S.I., and molds on regular cycles.

Protective Cream for Skin

For the protection of the skin against dirt, paint, and grease, the Finishes Division, of du Pont, offers a new vanishing cream, especially compounded for this purpose. "Pro-Tek" is not a soap, and is claimed to be entirely harmless and non-irritating to the skin. When applied to the skin it forms an invisible glove, and it is being widely adopted by plant physicians and executives for use in factories, etc.

Filtering Medium

A filtering medium with many distinctive advantages has been placed on the market by The Hudson Coal Company, under the name Anthrafilt. Specific gravity is 1.50—only 55 per cent. as heavy as sand—and it gives greater bed expansion. Attrition losses are practically negligible, and it is said to give better operating results at less cost.

Cleaning Composition

A French patent gives a composition of 455 parts corn flour, 40 parts copper sulfate, and 5 parts alum, mixed with boiling water, for use in cleaning walls, paint, etc.

Translucent Paper

Preparation given in U. S. P. 1,996,858 consists in impregnating paper with a solution of sucrose octoacetate with or without an addition to as much as 5 per cent. of a normally solid fatty acid but otherwise of sucrose octoacetate alone in a volatile solvent, followed by the operation of driving off the solvent.

Insecticides from Higher Fatty Alcohols

The higher alkyl rhodanates are revealed as being highly effective insecticides, according to a paper presented by Bousquet, Dietz and Salzberg to the ACS. Combined with active wetting agents, the product is self-emulsifying, less toxic to higher animals than nicotine, and gives superior control of more resistant insects such as mealy bugs, thrips, and red spider.

Bromine As a Cellulose Solvent

Experiments carried on by Beutel and Kuzelnigg and noted in the *Chemiker Zeitung*, prove that cellulose can be completely dissolved by liquid bromine. The authors have found, too, that keratine is also soluble in excess of liquid bromine.

Metal Polish

U. S. Patent 1,997,989 lists preparation containing a substance included in the group of maleic acid and acid salts of maleic acid as an active constituent.

Anti-Freeze Composition

A cooling medium, having a freezing point below –45° F. and a boiling point above 217° F., given in U. S. P. 1,997,735. Composition is formed by adding two pounds of calcium chloride and seven ounces of aluminum chloride to glycerin, one pint, and water as one gallon.

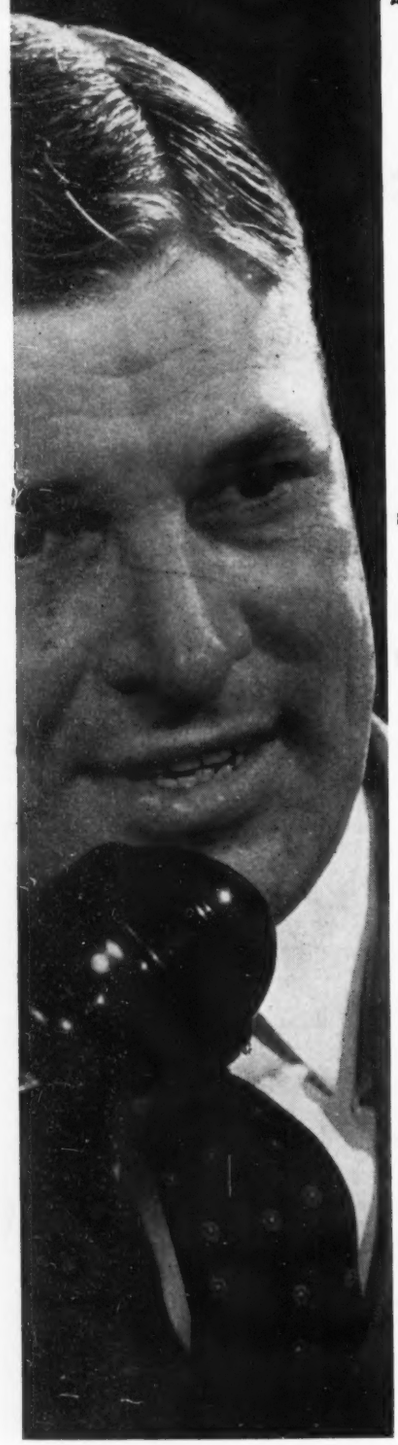
Moleskin Dyeing Process

A process of immunizing furs from dermatitis has been developed by F. Thomas Maskell, Horley, Surrey, England, and reported in *The Chemical Trade Journal* (London). Process at present is restricted, with some exceptions, to moleskins, but eventually will be applicable to any kind of fur. "Strathanisation" is said so to reduce the cost of processing that it has been possible to increase by 20 per cent. the price paid to trappers and at the same time lower by 15 per cent. the price of moleskins.

Compound Fertilizer

A compound fertilizer manufactured abroad is winning favorable attention in its application to wheat-growing, potato cultivation, and other similar agricultural uses. Ingredients are a mixture of nitrate of magnesia and lime; the magnesia content increasing the quality of wheat by improving its gluten content. It is also much easier to distribute than the usual lime nitrate fertilizers. Product is manufactured by Kuhlmann, and sold by Vilain Freres, Bourbourg, (Nord) France.

"By Tuesday morning we'll run out of Aniline"



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ORGANIC CHEMICALS

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1:2:4 ACID
ACETYL ORTHO-TOLUIDINE
ALPHA-NAPHTHOL
ALPHA-NAPHTHYLAMINE
ALPHA-NITRONAPHTHALENE
AMINOAZOBENZENE-SODIUM-SULFONATE
AMINOAZOTOLUENE
AMINO G SALT
AMINO J SALT
ANILINE
ANTIOXIDANTS
BENZIDINE (BASE)
BENZOIC ACID, TECHNICAL
BETA-HYDROXYNAPHTHOIC ACID
BETA-NAPHTHYLAMINE
BROENNER'S ACID
CATECHOL
CHICAGO ACID
CLEVE'S ACIDS
CRESIDINE
DENATURED ALCOHOLS
DIANISIDINE (BASE)
DIBENZYL-PARA-AMINOPHENOL
DIBUTYLAMINE
DIETHYLANILINE
DIETHYL-META-AMINOPHENOL
DIMETHYLAMINE
DIMETHYLANILINE
DINITROBENZENE
DINITROCHLOROBENZENE
DINITROPHENOL
DINITROSTILBENEDISULFONIC ACID
DINITROTOLUENE
DINITROTOLUENE OIL
DI-ORTHO-TOLYLTHIOUREA
DIPHENYLAMINE
EPSILON ACID
ETHER
ETHYLACETANILIDE
ETHYL ALCOHOL
ETHYLBENZYLANILINE
FLOTATION REAGENTS
GAMMA ACID
G SALT
INHIBITORS
J ACID
KOCH ACID
L ACID
LAURENT'S ACID
METANILIC ACID
META-NITROANILINE
META-NITRO-PARA-TOLUIDINE
META-NITROTOLUENE
META-PHENYLENEDIAMINE
META-TOLUIDINE
META-TOLYLENEDIAMINE
META-XYLIDINE
MICHLER'S KETONE
MIXED-MONONITROTOLUENES
MIXED-MONONITROCHLORO-BENZENES
MIXED-MONONITROXYLENES
MIXED-TOLUIDINES
MIXED-XYLIDINES
MONOBENZYL PARA-AMINOPHENOL
MONOCHLOROBENZENE
MONOETHYLANILINE
MONOETHYL-ORTHO-TOLUIDINE
NEVILE & WINTHER'S ACID
NITROBENZENE
NITROBENZENE-META-SULFONIC ACID
NITRO FILTERS
OIL OF MIRBANE
ORTHO-AMINOPHENOL
ORTHO-ANISIDINE
ORTHO-DICHLOROBENZENE
ORTHO-NITROANISOLE
ORTHO-NITROCHLOROBENZENE
ORTHO-NITROPHENOL
ORTHO-NITROTOLUENE
ORTHO-TOLUIDINE
ORTHO-TOLUIDINE-META-SULFONIC ACID
PARA-AMINOBENZOIC ACID
PARA-AMINOPHENOL (BASE)
PARA-DICHLOROBENZENE
PARA-NITROANILINE-ORTHO-SULFONIC ACID
PARA-NITROBENZOIC ACID
PARA-NITROCHLOROBENZENE
PARA-NITROPHENOL
PARA-NITROTOLUENE
PARA-PHENETIDINE
PARA-TOLUIDINE
PERI ACID
PHENYL-ALPHA-NAPHTHYL-AMINE
PHENYL-BETA-NAPHTHYLAMINE
PHENYL GAMMA ACID
PHENYL-METHYL-PYRAZOLONE
PHENYL PERI ACID
PICRAMIC ACID
PICRIC ACID
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R SALT
S ACID
SCHAEFFER SALT
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SODIUM PARA-NITROPHENOLATE
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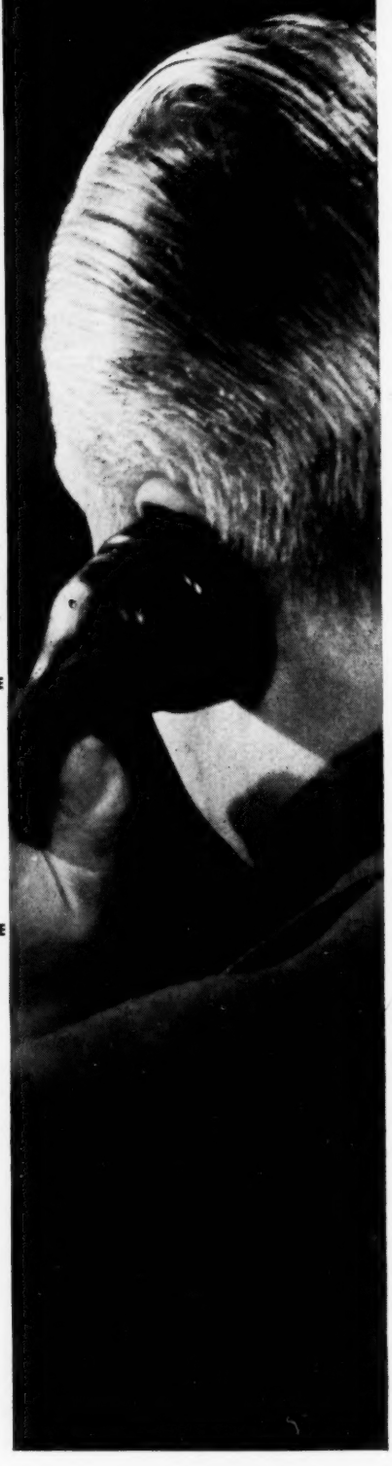

E. I. DU PONT DE NEMOURS & COMPANY, INC.
Organic Chemicals Dept., Wilmington, Del.

Booklets and Catalogs

A144. American Colloid Co., 363 W. Superior st., Chicago. New mailing piece indicates the uses of bentonite.

A145. "Alcohol Talks." Commercial Solvents Corp., Terre Haute, Ind. May issue is devoted to introducing some members of the alcohol family.

A146. "Chemical Progress." The Dow Chemical Co., Midland, Mich. In the typical Dow way this latest brochure maintains the very high standards of advertising set by this company. Beautifully illustrated, the booklet shows the highlights of the Dow organization, discusses the new plant for extracting bromine from sea water, reports on Dowmetal and the part it is playing in exploration of the stratosphere; shows the uses of calcium chloride on highways, the Dow service for oil and gas wells, and finally contains illustrations of the Io-Dow plant at Long Beach, Calif. A most useful chart shows what industries use each Dow product and provides a list of over 250 Dow chemicals.

A147. E. I. du Pont de Nemours & Co., Wilmington, Del. Most interesting booklet describes du Pont PX Cloth, its use for binding of books and shows several of the latest publications using this binding.

A148. "Givaudanian." Givaudan-Delawanna, Inc., 80 5th ave., N. Y. City. The manufacturer of chemical specialties will find this monthly of very valuable assistance.

A149. "Ceramic Forum." O. Hommel Co., 209 4th ave., Pittsburgh. Glass and ceramic products producers find this monthly news bulletin helpful. This Department will be glad to see that your name is added to the mailing list.

A150. "The Hercules Mixer." Hercules Powder Co, Wilmington, Del. The Brunswick plant where interesting chemicals from naval stores are produced is featured in the May issue.

A151. Magnus, Mabee and Reynard, 32 Cliff st., N. Y. City. May-June issue of the price catalog of this leading essential oil house is available.

A152. Mallinckrodt Chemical Works, St. Louis. June catalog is ready for distribution and contains several important price revisions on fine and industrial chemicals produced by this company.

A153. "Chemistry and You." Arthur R. Maas Chemical Laboratories, Los Angeles, Calif. Latest issue describes the growth of the Maas Chemical Co., and lists and describes the principal chemicals manufactured by this important Pacific Coast source.

A154. "Silicate P's & Q's." May issue discusses the use of silicate in preventing and/or curing rust in pipes in industrial plants, particularly in laundries.

A155. Diamond Alkali Co., Pittsburgh. A four-page leaflet stresses the strategic plant location at Painesville, Ohio, and its importance to alkali and chlorine users.

A156. "Dichlorethyl Ether." Carbide & Carbon Chemicals Corp., 30 E. 42 st., N. Y. City. A discussion of the uses of this most active solvent. An offer of cooperation on the part of Carbide chemists to help users or possible users is made.

Equipment

A157. "Aluminum News Letter." Aluminum Co. of America, Pittsburgh. Each month discusses the latest uses for aluminum.

A158. Binks Manufacuring Co., 3114-40 Carroll ave., Chicago. New 8-page folder contains complete spray nozzle data and selection charts for all principal applications in the industrial field.

A159. "The Moly-matrix." Climax Molybdenum Co., 500 5th ave., N. Y. City. Discusses each month the uses of molybdenum in industry.

A160. "Cable Accessories." General Electric, Schenectady, N. Y. As a companion book to GEA-1731, "How to Make Cable Joints," issued last year, the G. E. now has available a new publication, GEA-1839, "Cable Accessories." The 2 books should be of interest and assistance to everyone who is engaged in work that involves the jointing and terminating of insulated cable.

A161. General Electric. Gea-1972 reports on a new high-speed oil-tight circuit breaker for 50,000-kv-a. service.

A162. General Electric. Gea-2123 reports on a new type of outdoor, drop-out, fuse disconnecting switch.

A163. General Electric. Gea-2127 reports on ending of troublesome maintenance with G.E. knife switches.

A164. "Facts on Power Transmission." Graton & Knight Co., Worcester, Mass. Executives and engineers will want to see this new publication presenting a complete economic study of that most important management problem of today—the application of power to the work. This discusses fully the economics of the 2 generally used systems—individual motor and modern group drive. This much talked about and highly important subject has been handled very capably in a graphic, 44-page presentation, recently published. The necessary facts and figures have been made readable and interesting by the liberal use of drawings and illustrative material.

A165. "Cadalyte Service Bulletin." The Grasselli Chemical Co., Cleveland, Ohio. May bulletin discusses the Hull and Strausser Test for determining the thickness of cadmium and zinc electrodeposits.

A166. Hardinge Co., York, Pa. This company has recently published Bulletin No. Ah-323, which is the first official publication on the Hardinge-Hadsel Mill, which mill has undergone development during the past 4 years, the last year of which was used to prove beyond all question of a doubt that the mill would work under all conditions and under different types of ores, as well as establish a definite basis upon which operating costs could be figured.

A167. "At Last—Graphical Vapor Pressure." C. J. Tagliablue Mfg. Co., Park and Nostrand aves., Brooklyn. This booklet which discusses in detail the graphical measurement of vapor pressure is one of the outstanding contributions to the recording field.

A168. "Diaphragm Valves." C. J. Tagliablue Mfg. Co. Bulletin No. 1117 discusses the latest Tag valve development—a new long grange throttling top.

A169. "The Nickel Industry in 1934." The International Nickel Co., Wall st., N. Y. City. An authoritative survey of the uses introduced last year.

A170. Link-Belt Co.,910 S. Michigan ave., Chicago. Recently off the press is a 16-page illustrated catalog No. 1542, devoted to Straightline Collectors for removing sludge and scum from rectangular tanks at sewage and water treatment plants.

A171. Mine Safety Appliances Co., Braddock st., Pittsburgh. Every chemical plant should be thoroughly equipped with warning and safety signs. New leaflet illustrates many that can be procured from this company.

A172. "The Alloy Pot." The N. J. Zinc Co., 160 Front st., N. Y. City. Mr. Bonbright of Chevrolet Motor on pages 4 and 5 . . . the new Oldsmobile radiator grille and the Crown Slide Fastener, the largest and the smallest zinc alloy die castings, page 6 . . . and an interesting engineering table on page 7 . . . these are the high spots but you can read the entire issue in 17 minutes.

A173. "Parkerizing." Parker Rust-Proof Co., 2174 E. Milwaukee ave., Detroit. A new presentation of this modern process for the protection of iron and steel products shows how both a finish and rust prevention can be applied in one operation.

A174. Pulmosan Safety Equipment Co., 176 Johnson st., Brooklyn. Discusses the latest in safety ladders for the plant.

A175. Republic Steel Corp., Massillon, Ohio. Folder explains the manifold advantages of Enduro stainless steel for textile equipment.

A176. Surface Combustion Corp., Toledo, Ohio. Latest folder deals with Standard burners and burner equipment. Well illustrated.

A177. "Modern pH and Chlorine Control," W. A. Taylor & Co., 872 Linden ave., Baltimore, Md. A 54-page booklet describes and illustrates latest equipment.

A178. Voland & Sons, Inc., New Rochelle, N. Y. Circular reports on a new large capacity analytical balance which comes in ½, 1 and 2 kilo capacities.

A179. Wyo-lite Insulating Products, 4600 E. 71 st., Cleveland, Ohio. A new circular contains descriptive matter on the subject of Wyolite Plastic Insulation and unusual results obtained on all types of heated surfaces. Chemical plant engineers will find this booklet well worth reading.

A180. Worthington Pump & Machinery Co., Harrison, N. J. L-620-B8 discusses vertical angle air compressors.

A181. Worthington Pump & Machinery Co. L-621-B6 discusses vertical single air compressors, single stage.

A182. Worthington Pump & Machinery Co. W-321-B2A discusses Monobloc centrifugal pumps.

A183. Worthington Pump & Machinery Co. W-102-B1 discusses horizontal duplex piston pumps.

A184. Garrison Engineering Corp., Waterbury, Conn. Reports on the Garfire Gun, the newest unit of the Garrison duGas Dry method of fire extinguishment.

Containers, Packaging Equipment, Handling Equipment, Etc.

A185. Burt Machine Co., Baltimore, Md. New leaflet contains data on the latest in Burt labeling and casing machines.

A186. Anchor Cap & Closure Corp., Long Island City. A monthly bulletin is devoted to showing new uses for Anchor molded caps.

A187. The Elwell-Parker Electric Co., Cleveland, Ohio. A 32-page beautifully illustrated brochure "This New Industrial Pick-Up" is most enlightening data on the subject of trucks for moving materials about the plant and the pallets that increase storage facilities as well as make handling operations easier.

A188. J. L. Ferguson Co., Joliet, Ill. "Packomatic" is a monthly devoted to news of installations of Ferguson packaging equipment.

A189. Stokes & Smith Co., 4917 Summerdale ave., Philadelphia. New 4-page leaflet gives full details about the S & S Tight Wrapping machine.

A190. "Packaging." Pneumatic Scale Corp., 59 Newport ave., Norfolk Downs (Quincy) Mass. If you are not a steady reader of this interesting monthly devoted to discussion of latest developments in packaging machinery this Department will be glad to arrange for you to receive it regularly.

Received Late for Classification

A191. Merck & Co., Rahway, N. J. June Price List.

A192. LaMotte Chemical Products Co., Baltimore, Md. An interesting booklet on "Significance of Periodic Soil Tests."

A193. Solvay Sales Corp., 40 Rector st., N. Y. City. "The Anchor Travels South," is an attractive booklet descriptive of the company's new Baton Rouge plant. Every user of alkali will want a copy to read and file.

A194. Pulmosan Safety Equipment Co., 176 Johnson st., Brooklyn, N. Y. A 4-page circular deals with improved type of dust respirators.

A195. Fritzsche Brothers, 78 Beekman st., N. Y. City. This important factor in the essential oil field issues a new price catalog.

A196. Pfizer & Co., Maiden Lane, N. Y. City. The June price catalog of fine chemicals shows several important price revisions.

A197. Standard Oil of N. J., 26 Broadway, N. Y. City. "Oil-Ways" is a valuable monthly devoted to lubricating problems.

A198. Wishnick-Tumpeer, Inc., 251 Front st., N. Y. City. April-May issue of "Wicomings" contains a wealth of information on a wide variety of interesting subjects. Users of chemicals are welcomed as regular subscribers without charge.

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Plant Operation and Control

A Digest of the Current Literature for Makers of Chemicals

Uses of Plastic Materials in Chemical Equipment

By M. B. Donald

That plastic materials are being used in chemical plants in increasing amounts as materials of construction is due to the fact that they are non-conductors of electricity, and therefore do not corrode like metals; they have resilience to absorb mechanical shocks; and finally they have a low specific gravity which makes them light to handle. Problem of choosing a plastic for making or lining for equipment, however, is a difficult one.

Tensile strength of laminated artificial resins at ordinary temperatures compares with that of the best type of timber. This increase of strength due to lamination has made it possible for the resin to be made into bolts, nuts and gears which give good service. Lamination also gives increased resistance to mechanical shock. It is at higher temperatures, however, that resin is superior to ebonite for chemical equipment. Ebonite softens appreciably at 65° C. and can be bent at 100° C. It can be cut with a knife at 115° C. and melts at 200° C. Artificial resin, however, will stand 150° C. continuously, provided that it has been previously taken up to that temperature in order to allow the resin to further harden and shrink; that is, provided it has been properly annealed. On the other hand, soft rubber can be used up to 110-130° C. so that the choice would depend on the strength required, the relative resistance to the chemical in question, and, lastly, their relative costs.

Chief object in coating metal vessels with resin, where pressure cannot be employed, is to avoid formation of blisters, due to vapors escaping, whether from dampness of materials used or from solvents employed with the resin. Trouble can be eliminated to a large extent by slow and careful drying in initial stages, use of porous textiles, etc. Another difficulty is the large difference in the coefficients of thermal expansion of the metal and the coating, which gives rise to internal stresses and tends to dislodge the resin from its base. This can be modified by hardening the resin from the inside to the outside by applying heat to the metal and by the use of an intermediate elastic layer.

In the manufacture of a vessel 6 ft. diameter and 6 ft. high in one piece, the use of a hydraulic press is out of the question, and considerable shrinkage may occur on hardening. In 1925 it was suggested spreading a mixture of half resin and half asbestos in a layer 4 cm. thick over the inside of an iron cylinder, which had been previously dusted with quartz powder to prevent sticking. A certain amount of pressure could be applied to the resin layer by loose segments of sheet metal kept in place with springs. After hardening, the surface crust was removed by sand blasting and the vessel heated to 200° C. or more for 30 to 70 hours. A final coat of resin was then applied to the surfaces. Such a vessel will have a porosity of from 1% to 3%, although it is stated that for sudden changes in temperature a higher porosity is desirable.

An important contribution from the I. G. in '26 was to build a laminated article from resin and wide-meshed fabric, which would have sufficient strength of its own not to need a metal support. Thus, tubes could be made by winding the fabric and liquid resin on to a core smeared with oil, paraffin wax, talc or graphite to prevent adhesion. Core can also be made of oil paper or with Rose metal melting at 95° C. Product is sufficiently strong to bear screw threads and can be sawn, drilled or turned like wood. If the core is a hollow pipe, initial warming and drying can be easily carried out by admitting steam on the inside. Flangers can be built up by winding on narrow strips of the resin-saturated material.

A laminated resin product known as Keebush has recently been developed in England, with special regard to the chemical engineering aspects of the material, and can also be obtained in molded forms. Tests on a laminated 1-in. bolt of this material gave a breaking load of 6.7 tons per sq. in., which is considerably in excess of the figure given at the beginning of this paper.

The condensed and hardened phenolic and cresylic resins are remarkably resistant to chemical attack and lists of chemicals. They should not be used for oxidizing acids such as nitric and chromic; for sulfuric acid over 50%; for organic bases such as pyridene and aniline; for acetone or for sodium hypochlorite. Slight swelling is caused by toluene and glacial acetic, but this is not usually objectionable.

Use the Correction Sequence

Fact that a substance is unsuitable is not always an indication that resin cannot be employed. For instance, in the preparation of aniline hydrochloride it is only necessary to fill the vessel with acid and pour in the aniline while stirring. It can also be used for making iron bromide, an intermediate stage in the preparation of alkali halides, from iron and the halogens. Although it is unsatisfactory for sodium hypochlorite it has been recommended for use with calcium hypochlorite and liquors containing chlorine. Care has to be taken in the selection of a suitable filler. Wood flour is definitely unsuitable and even an asbestos filler must be of the acid-resisting kind when vessels are designed for use with strong acid. For fluorine compounds a graphite filler is most suitable.

As would be expected from their constitution, the phenolic type resins are not resistant to caustic alkali or to alkaline solutions, *e.g.*, sodium hypochlorite, previously mentioned.

Laminated resin pipes are excellent for handling corrosive liquids because of their strength and toughness compared with other similar materials.

Thick filter plates of resin harden from the outside to the inside, as the resin is a bad conductor of heat, and this effect tends to set up damaging tensions which result in the plate becoming warped or cracked in use. These stresses are especially noticeable if the plate is made of layers having a different composition; for example, asbestos or cellulose fibres as a filler. It has been proposed to anneal plates containing asbestos only at from 150° to 180° C. for 2 to 3 hours, or, if they are made with cellulose fibres and will therefore not stand such high temperatures, for 3 to 4 hours or longer periods at about 150° C. During the annealing the plates must be kept rigid on skeleton

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supports. Wooden filter plates have been coated with resin to resist the action of hydrogen peroxide and oxalic acid.

Use of laminated resin for making silent and acid-resisting gears is of great interest to the chemical industry. On a felt sizing machine, using a weak solution of nitric acid and mercury, Bakelite gears were found to give satisfaction. Fume hoods of resin have been used for removing moisture from pulp- and paper-drying rolls so as to avoid any products of corrosion falling on the material being dried. Oven trays are used in the foodstuff, dyestuff and fine chemical industries. Paper delivered by M. B. Donald before the British Chemical Engineering and Plastic Groups and summarized in British *Chemical Age*, Mar. 30, p286.

Heavy Chemicals

Possible Uses for Liquid Ammonia

Several possible uses for liquid ammonia are discussed in the *Journal of the Chemical Society of Russia*, December, '34, p45-47 by the chemists Wassiliev and Portov. In Japan study is being made of a modification of the present method of making soda ash consisting in bubbling CO_2 into a solution of salt in liquid ammonia, the liquid ammonia dissolving about 15% of the sodium chloride. Other possibilities are pointed out. By bubbling hydrocyanic gas into a solution of calcium chloride in liquid ammonia, calcium cyanide is precipitated, and ammonium nitrate remains in solution. Nitrates are easily soluble in liquid ammonia. In the synthesis of urea, the presence of liquid ammonia permits the yield to be increased and the manufacture to be simplified. Liquid ammonia may be usefully employed in the manufacture of metallo-organic compounds and as an extraction of sugar, bitter principles, saponines, the alkaloids of coffee, and nicotine with liquid ammonia, are covered in patents granted to the I.G. The electrolysis of salts dissolved in liquid ammonia gives the corresponding metals. This method has acquired a particular importance in the preparation of beryllium, which is obtained very pure and with improved mechanical properties. By electrolyzing a solution of sodium chloride in liquid ammonia, there is obtained high strength sodamide and ammonium chloride with a good current efficiency. The alkali metals themselves dissolve in liquid ammonia, and the solutions possess very intense reducing powers. They are used to make alloys of lead and sodium.

New Flue Gas Scrubber Method

New process has been developed for the simultaneous removal of grit, dust and oxides of sulfur from flue gases, in which the removal is effected in an efficient and compact scrubber using a recirculating aqueous medium treated with lime or chalk.

Direct Fixation of Nitrogen to Bases

Under very high pressures the direct fixation of nitrogen to bases is said to be possible and the method for the production of barium nitrate is said to be descriptive of the general process. Nitrogen, oxygen and barium oxide are employed and when temperatures of 800 to 900° C. are reached barium nitrate is produced in about 2 or 3 hours.

Solvents

German Method of Dehydrating Alcohol

The I. G. process employing calcined and finely powdered gypsum for alcohol dehydration is described in a short article in the May 3 issue of the *British Chemical Trade Journal*, p335. The process is in full operation at the Leverkusen Works and the plant has an output of 70,000 liters of absolute alcohol per 24 hours starting from a 94% raw product, and with a yield of 99.8 to 99.9%. In this plant, use is made of 2 horizontal tapering drums, each 8 meters long by 1.2 to 1.5 meters diameter, through which the gypsum is transferred counter current to the alcohol vapor by an Archimidean screw. The speed of the alcohol vapor is 404 liters per second, and the duration of the reaction is 15 to 16 seconds. Steam consumption is low; the total required for the 2 operations, the dehydration of the alcohol and the dehydration of the used gypsum, being 50 to 52 kilogs per 100 liters of absolute alcohol. The loss of gypsum in the process is negligible, never exceeding 1.5 kilogs per 100 liters of alcohol. The plant has proved itself easy to operate, while the raw alcohol can be treated without any preliminary purification.

In this process the anhydrite is transformed into semi-hydrate without loss of its powdery form or of its apparent dryness. The anhydrite is regenerated in a drying drum at 175° to 185°C. Any gypsum dust in the dry alcohol is removed by passage of the vapors of this material through a filter.

Improvements made since the original introduction of the process consist largely in the methods for the removal of the heat evolved by the hydration of the gypsum which amounts to about 42 calories per kilog of calcium sulfate. At several points in the alcohol dehydration drum, a spray of cold raw alcohol is introduced, and this by its evaporation and drying absorbs the heat. Further, a part of the crude alcohol, preliminary warmed up in a heat inchanger by the hot vapors of the absolute alcohol, is passed through a jacket which surrounds the dehydration drum, and the vapor produced is led back to the supply of vaporized raw alcohol entering the drying drum. By this means a constant temperature is assured on the whole surface of the drying drum.

Safety

A Study of the Toxicity of Methanol

Toxicity of methyl alcohol or methanol has been studied by Prof. Alberico Benedicenti, director of the Pharmacological Institute at Genoa and published in the Italian *La Ricerca Scientifica*. He directed part of his work to determining whether the toxicity is caused by the methanol or by possible impurities.

Harmful material in wood alcohol derived from wood distillation was found to be allyl alcohol, present in amounts of about 0.5% and which is 150 times more toxic than methyl alcohol. It is to this impurity that the harmful effects of methyl alcohol on the eyes are due.

In regard to synthetic methanol obtained from carbon monoxide and hydrogen, impurities are much less. According to analyses made, synthetic methanol from the Terni works has as impurities: Aldehyde (in terms of formaldehyde), 0.001%; acetone, 0.02% to 0.08%; amines, 0.012%; sulfur, 10 milligrams per liter; chlorine, less than one part per million; acidity (expressed as formic acid), 0.29%; ethers (in terms of methyl acetate), 0.024%; higher alcohols, 0.5%. Allyl alcohol and allyl compounds, as well as arsenic and arsenic compounds, are quite absent in synthetic.

Trial tests with highly purified methanol showed that it is toxic, and that its toxicity is not increased by the impurities present in commercial synthetic methyl alcohol. Action of the methyl alcohol on the human organism has by no means been cleared up, but it is established that susceptibility to it is partly a matter of individual physiological idiosyncrasy. It is certain that methyl alcohol is eliminated from the body very slowly, and is probably oxidized in the body to formaldehyde and formic acid to which the actual toxic effects may ultimately be directly due. This has not been definitely proven.

Vapors of methyl alcohol, according to Benedicenti's experience makes it probable that the organism can become accustomed to the ingestion of considerable quantities of vapor without any untoward effect. Action of methyl alcohol on the skin is not considered more harmful than that of other solvents such as acetone, benzol, and ethyl alcohol if the skin is clean and free from abrasions.

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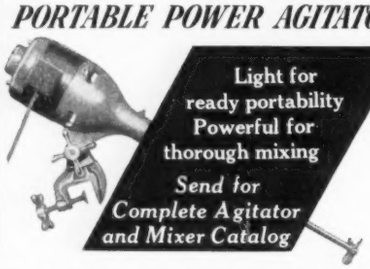

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Contents

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Another series of experiments proved that on combustion methyl alcohol does not give rise to gases more toxic than do benzol or gasoline. Author concludes that there is no case for the exclusion of methyl alcohol from industrial practice, but that the same precautions as to ventilation and cleanliness should be observed as obtained with benzol. This work was digested in *La Chemical l'Industria* and reported in British *Chemical Trade Journal*, May 3, p335.

Coal-Tar Chemicals

"Pure Coal"—A New Industrial Raw Material

Considerable interest is aroused in England by a paper read before the Institute of Fuel describing "pure coal." British *Chemical Age* comments on the idea editorially as follows:

"In coal, purity is often considered solely as a matter of ash; it may be considered also as a matter of certain inorganic constituents of the coal, such as phosphorus, sulfur or chlorine, but whichever component is considered "pure coal" is still commercially pure. To explain this new development attention will be confined to the slack coal. Slack as mined contains, let us say, 20% of ash; when washed by ordinary means the ash comes down to 4 or 10% according to the class of coal; when washed by special means, or when washing a special coal with great care, the ash may be down to 2 or 4%—that is "clean coal." "Pure coal" contains below 1.0% and often as low as 0.2% of ash. The method is, in theory, quite simple. Coal has been divided by Dr. Marie Stopes into 4 major ingredients: fusain, clarain, vitrain and durain. The durain, a mixture of pitch-like jelly and plant remains is the heaviest and usually the highest in ash; fusain, the woody charcoal-like portion, is high in ash—often higher than durain—but because of its cellular structure floats with the lightest coal. It is necessary to remove the fusain if the product is to be "pure coal"; it is not necessary if the product is to be "clean coal." Of the two portions that remain, vitrain is the "jelly" only and is usually singularly pure, while clarain, which contains some plant remains, may or may not be pure enough for the purpose. Having removed the fusain, the vitrain is the lightest portion of the residual coal, so that all that remains is to float off the vitrain and as much of the clarain as may be permissible. This is done in a solution of calcium chloride of the correct specific gravity.

"The difficulty of the process comes in the fact that the calcium cloride must be kept to within 0.01 sp. gr. if the process is to be successful. Since all coal contains water this is a matter of some difficulty. It is done by passing the incoming coal through a number of calcium chloride solutions of increasing gravity and, after reaching the correct solution where it is floated, the coal and the reject are separately passed back through all the solutions in the reverse order. It is said that this coal will find applications in the aluminium industry for the production of the very clean coke required for making electrodes; for hydrogenation; and as a fuel for the coaldust internal combustion engine. There may be other uses in the chemical industry where a pure carbonaceous material is needed for some process. "Pure coal" is being produced in Germany in considerable quantities, and the plant described at the meeting in question is now in operation at the Ougree Marihaye colliery in Belgium."

The Laboratory

Determining Ethylene Oxide Concentration

Chemische Industrie contains an official method for the rapid determination of the atmosphere of rooms containing ethylene oxide employed in fumigation work. A 40% potassium thiocyanate solution is the reagent in one method, while the other is based upon 22% common salt solution and phenolphthalein.

Conversion of Arsenious to Arsenic Acid

A new method for the quantitative conversion of arsenious acid into arsenic acid has been worked out on the laboratory scale, according to the British *Chemical Trade Journal*, May 10, p354, by the Russian chemists, Kirchof and Korsina. Process consists in passing oxygen into a mixture of 1 gram-molecule of white arsenic and 0.1 gram of iodine in 224 c.c. of water, while adding gradually 16 c.c. of nitric acid.

Plant Equipment

"Chem Engineers" Hear of New Equipment

Violation of every rule of good electrical engineering practice so as to encourage resistance, low power factor, hysteresis losses and eddy currents—the plagues of the electrical engineer but the joys of the induction heating engineer—has resulted in the development of the chemical engineer's highly efficient electrical heater, based on electro-magnetic induction. The application of this new device was described to members of the A. I. Ch. E. in convention at Wilmington, Del., by Charles E. Daniels of the duPont Co

The induction heater described is fundamentally a poorly designed transformer, in principle not very different from those which hang on poles along streets in small communities for stepping down the high voltage line current so that it may be used at 110 v. in domestic dwellings. The chemical is loaded into an iron or steel vessel, in essence the counterpart of the transformer core and the secondary winding. An electric wire is wound around the vessel, this corresponding to the primary winding of a transformer.

The whole heater is then wrapped in an insulating material and the electric current turned on. Electromagnetic lines of force, induced by the coil, cut back and forth through the chemically loaded vessel, 60 times a second at normal frequencies. Bad electrical practice, purposefully employed, causes the electrical energy to be dissipated in heat in the reaction vessel, just where the chemical engineer wants.

A Thin Disc that Bursts at Predetermined Pressures

Constructing a metal device, not to withstand loads, but actually to be ruptured and fragmented when loads reach a predetermined amount, has called for as much research, ingenuity and mathematical determination as usually applied to the development of ultra-strong metals and alloys. This paradoxical situation was also explained at the recent Wilmington meeting of the engineers by Morgan E. Bonyum of the duPont Dye Works, Penns Grove, Pa., who has made a study of the use of frangible metal discs instead of safety valves for the protection of chemical vessels operated under high pressure.

If a pressure vessel becomes overloaded an explosion may occur, destroying the vessel and adjoining plant structures and possibly causing serious personal injury or loss of life. But if the pressure is released before it reaches the danger point, the damage may be localized and probably will not exceed the loss of the tank contents. Safety valves, such as used on steam boilers proved impracticable or unreliable, according to Mr. Bonyum.

So the solution resolved itself into finding a metal that could be inserted in the vessel as a thin disc which would break exactly at the desired point. The idea had earlier been applied to the protection of small gas cylinders but never before to large plant units of several thousand cubic foot capacity.

Breaking point was dependent on the discs thickness, the strength of the metal and the weaking effect of corrosion and chemical attack. Metal sheets of uniform thickness were hard to find; alloys of metals were unreliable; corrosion and chemical attack narrowed the satisfactory metals down to but a few, including some precious metals. Finally, research yielded a solution, based on the use of a few annealed metals, as pure as

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obtainable commercially, and a new mathematical formula with which the rupture point of any disc may be predicated with extreme accuracy.

Platinum's Part in Chemical Equipment

Use of platinum in chemical equipment need not be confined to very minute parts discussion at the Wilmington meeting of the chemical engineers disclosed. It is quite feasible to make large vessels, tubing, etc., of the precious metal. The initial cost is naturally higher than if base metal alloys are used, but it should not be forgotten that the resale value of platinum is very high. Practically any shape can be fabricated, any necessary repairs can be easily made, and finally there is the peace of mind obtained by the assurance that the vessel will have a long and healthy life. Large amounts of gold and even greater quantities of both pure and sterling silver are being used for the manufacture of equipment to be used in the production of heavy chemicals on account of their special physical properties. Gold has a fairly high melting point and does not oxidize at any temperature. It is completely insoluble in the mineral acids. For certain chemical processes the entire apparatus is made of fine gold. The use of the pure metal may sometimes be necessary but it has the disadvantage that it is quite a soft material and is easily distorted. In order to increase its resistance to distortion it is necessary to alloy the gold with other materials. The addition of platinum metals to the gold is rather obvious since these rapidly increase the hardness and do not decrease, but rather increase, the resistance to chemical attack.

A new method has been developed for the sterilization of water which is being used now in several cities. This revolutionary method depends upon the use of silver electrodes. Silver lined vessels of large dimensions are being used in the manufacture of foods. Silver is not corroded by the acids in food and so is a very safe material for pans, etc., in this important industry.

Depreciation and Obsolescence Charges

Dr. Joseph J. Klein discussed depreciation and obsolescence charges in the chemical industry, and how they are affected by the "New Deal" before the recent N. Y. A. C. S. meeting.

Until the most recent Revenue Act, Congress consistently favored, in determination of taxable net income, a reasonable allowance for exhaustion, wear and tear of business property, including a reasonable obsolescence allowance. The Ways and Means Committee rejected in '33 a proposal of its subcommittee that for '34, '35 and '36 only 75% of the acutal depreciation should be permitted as a deduction, although it was alleged that the change would result in increased annual revenue of $85,000,000.

In the '34 Act, Congress, endeavoring to restrict tax deductions resulting from security net losses to $2,000, unnecessarily extended limitation to factory equipment and other business property. Ridiculous result is that often it is advisable to abandon property or to destroy rather than to sell for scrap.

The Treasury properly opposed proposal to limit depreciation deductions to 75% of actual depreciation, and in lieu stated that more effective enforcement of the existing statute would net an equivalent of the sought $85,000,000.

Effect of proposed administrative change would be to reduce by about 25% average depreciation theretofore allowed, but in actual practice, in order to achieve the desired fiscal result, average reduction is estimated at about 40%, an utterly impossible goal to attain under existing tax rates and on the present level of income, provided the law is fairly interpreted.

As a part of the changed Treasury policy, taxpayers now have the burden of supporting depreciation claims, which is not unfair, even though much additional expense is involved. Unfortunately, some irresponsible field agents have interpreted the Treasury's pronouncement as a command arbitrarily to reduce claim depreciation by 25%, regardless of the justification of the taxpayer's claim.

For the 6 years ('29-'34), on the basis of an analysis of the reports of 20 leading corporations in the chemical industry, depreciation on the basis of gross assets varied from 4.22 to 4.89%, and was 4.29% for '34. On the basis of net earnings, depreciation reached 40.6% in '29 and was 61.5% in '34; the highest ratio was 89.4% in '31. Compared to dividends, depreciation represented 107.5% in '31; during the 6 years was never lower than 66% and amounted to 73% in '34. Depreciation claimed by these 20 corporations varied from $1.32 per share in '34 to $1.82 in '30.

The 1650 corporations which reported taxable income for '32 were allowed to deduct depreciation aggregating about $147,000,000; if the 40% reduction were applied, $59,000,000 would have been disallowed, which is equivalent to over $8,000,000 in taxes, a net difference of about $51,000,000, which represents about 20% of the reported net income for that year.

Because lawful tax avoidance is sanctioned by the courts, your industry will in many instances undoubtedly avoid disposing of equipment at scrap value, and rather than abandon it or have it destroyed. Additional recourse will undoubtedly be had to professional engineering and auditing services in order to utilize to the maximum extent whatever tax savings with respect to depreciation the law and the changed regulations permit.

More lawsuits will probably result, because it is unthinkable that your industry will accept supinely arbitrary and unfair reductions suggested by over-zealous employees of the Revenue Bureau. This will probably prove true, because most taxpayers are advised with respect to the attitude of the U. S. Supreme Court toward arbitrary changes in executive interpretation of laws which have long remained unchanged.

Taxpayers will find support for their insistence that fair depreciation methods should not be changed, with resulting distortion to results of operations, in the attitude of professional accountants who recognize that consistency in the maintenance of accounts is an essential virtue, a view which, in principle, has the approval of the New York Stock Exchange, the Securities and Exchange Commission, and other informed authorities. Throughout the past, industry has gradually acquiesced in Revenue Bureau depreciation rates for accounting purposes.

Too much is at stake, however, to assume ready acquiescence in arbitrary changes. Material reduction in the allowance for depreciation, so far as your industry is concerned, will produce difficulties of far reaching importance. Among these are the increased stockholder pressure for higher dividends in the presence of apparently larger net income; the danger under Sec. 102 of the 1934 Act, which provides a 25 to 35% surtax on corporate profits retained beyond the reasonable needs of the enterprise; and, finally, increased excess profits tax penalties, because in the capital stock tax return adequate provision was not made against unforeseen depreciation adjustments.

It has been surmised that one reason for the relatively satisfactory operations in your industry has been recognition of the need for adequate depreciation, which has facilitated substitution of newer devices as they came on the market and the abandonment of older equipment, in the presence of changed market demands. Radically reduced depreciation charges will inevitably combat this wholesome procedure.

British Pump Standards Published

British Standards Institution has just published a British Standard Specification for Pump Tests, designed to cover the determination of the performance and efficiency of pumps when handling clean water at temperatures up to 85°F.

Copies of this specification (No. 599-1935) can be obtained from the Publications Dept., British Standards Institution, 28, Victoria st., London, S.W.1, price 2s. 2d. post free.

New Equipment

A Material Breaker Saves Time QC 247

The Creasey Material Breaker is a device originally developed for breaking ice cakes into small bits for freezing ice cream, shipping fish and vegetables, etc. Its use has been extended to a number of other applications in chemical plants for breaking down cakes of material preliminary to melting, or before feeding into pulverizing equipment, where this preliminary breaking improves the efficiency and capacity of the equipment.

The breaking is accomplished by sharp pointed picks held by friction in sockets in the periphery of a heavy cast iron rotating drum. The size of the broken material is determined by interchangeable combs through which the broken pieces must pass before leaving the machine, and these combs may be changed and other features adjusted to break materials down to about the size of the finger tips. The machines are furnished in capacities ranging up to 50 tons per hour, capable of handling pieces of material as large as full size cakes of ice.

The Creasey Breaker is used in chemical plants for breaking down rosin, naphthalene, mineral rubber, carbolic acid, borax, shellac, and is suited for handling practically any material which will break and fall away when struck with a sharp pointed pick.

New Plunger Type Chemical Pump QC 248

A new plunger type chemical pump, developed especially for pumping exact quantities of water treating chemicals into water supplies at intervals depending upon the rate of water flow but adaptable to any type of liquid or semi-liquid chemicals and for close proportioning of coagulants, has been announced. Stroke adjustment of the pump can be set from 0 to 3 inches. Plunger is of special alloy and all working parts are nickel semi-steel. Plunger and cylinder of pumps from ½ in. to 3 in. in diameter are interchangeable, the ½ in. cylinder operating safely up to 1800 lbs. pressure, the 1 in. to 1000 lb. Pump, lubricated by modern pressure methods, may be operated by any type of actuating device such as chain or belt drive or electric motor. Its over-all height is only 23½ inches.

A New Idea in Pyrometers QC 249

A pyrometer which requires no charts, lead wires, correction tables and can be operated by unskilled hands recently has been brought out. It is only necessary to thrust the point of the instrument into the material to directly read the temperature on the gauge. This may be done in a matter of seconds. A small red push button near the scale operates a patented clamping device that either releases the indicating pointer or holds it as the operator may desire. Thermocouples may be attached in a very few seconds when necessary and will last for some time.

An Emergency Light for Plants QC 250

Chemical plant men appreciate the necessity for a thoroughly reliable emergency light and a new 40-lb., 8,000 candle power carbide light has recently been placed on the market.

Fighting Fire with a New Weapon QC 251

Executives and plant managers will be keenly interested in the latest amazing accomplishment of modern science—the Garfire Gun, a 3 lb., quickly and easily operated, instantaneous dry extinguishment of any incipent fire.

New Equipment for Porcelain Makers QC 252

An apparatus has been designed which, with little difficulty, enables the operator to determine accurately both the specific gravity and the viscosity of porcelain enamel slips. Apparatus consists of a brass pipette which at the narrow end is fitted with a standard thread, making possible the use of nozzles of various sizes, depending on the viscosity of the enamel to be measured. The same pipette with a different nozzle is therefore suitable for ground coats, as well as cover coats. With the aid of this pipette it is possible to reproduce and control the enamel used in dipping either ground coat or cover coat, as the case may be.

Nozzle in Spraying in Ceramic Work QC 253

Again keeping pace with developments in the ceramic industry the same company has placed on the market a new nozzle to be used in continuous spraying of pottery glaze and porcelain enamel. The glaze spraying nozzle can be adjusted to spray in any position desired and is free from clogging, the tip being constructed to give long life. As an added convenience the spray can be gradually changed from flat to round, or vice versa, by simply twisting a handily placed screw.

Vapor Pressure Recorder QC 254

A large instrument manufacturer has obtained the exclusive world-wide manufacturing and sales rights for a new vapor pressure recorder. This outstanding device is a development of Industrial Engineers, Inc., of Los Angeles, Calif., under the Kallam patents.

Now, instead of the long delayed results obtained from the Reid laboratory test, it is possible with this recorder, the new manufacturer claims to have a continuous record of vapor pressure instantly available.

New Magnetic Starter QC 255

A new line of oil-immersed magnetic starters of the reduced-voltage, autotransformer type, in which all arcing contacts are 6 in. under oil, has been developed.

New Diaphragm Valve QC 256

Importance of the valve as the business end of any control system and the need of matching the valve with the controller in precision and performance, leads to a new long range throttling top. This construction incorporates several new features of design. Particularly noteworthy is the arrangement for adjusting the spring pressure. The member in contact with the bottom of the spring does not turn when the adjusting feed screw is turned but guided by the two vertical fins of the spider arms merely moves up or down. Thus spring adjustment does not tend to wind up the spring or disturb its normal characteristic in any way.

New Barrel or Drum Hand Pump QC 257

A brand new hand barrel pump is now on the market with several important new features. It is constructed solidly of galvanized steel tubing, bronze and grey iron and is made without leather or composition washers or valves. Pump fits any standard drum or barrel and is adjustable as to height.

Chemical Industries,
25 Spruce Street,
New York City.

I would like to receive more detailed information on the following equipment: (Kindly check those desired.)

QC 247	QC 253
" 248	" 254
" 249	" 255
" 250	" 256
" 251	" 257
" 252	

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Packaging, Handling and Shipping

¶Sodium Shipped in Tank Cars!—Valuable Booklets on Various Phases of Packaging—A New Label Paster—Savings in Larger Chlorine Cylinders—Bemis Bags in the South Seas—

Light-weight, high-speed, streamlined trains are not the only new things this year in the transportation field chemical engineers were told at their recent meeting at Wilmington under the auspices of the American Institute of Chemical Engineers. For

Remarkable things are being done in the shipment of chemicals in tank cars—carbon black and now metallic sodium. General American Tank Car cooperated with du Pont engineers in this latest achievement.

chemical engineers have worked out a new, economical scheme for shipping sodium, which used to be shipped in brick, cube and rod form, according to a paper of P. J. Carlisle of the R. & H. Chemicals Dept. of the duPont Co., Buffalo, N. Y.

Heat the sodium and it melts, changing from a hard, rock-like solid to a liquid that can be pumped through pipes as easily as water. Pump it into a tank car, just like those used for oil and other fluids, let it cool and you have a homogeneous, solid block of sodium again, 80,000 lbs. in weight, filling every part of the tank with no wastage whatever, and furthermore hermetically sealed against moisture and atmospheric contamination. Ship it as far as you wish and when it reaches its destination, still as a solid block, a reapplication of heat changes it back again to liquid form, easily pumped from the tank car into industrial plants.

The tank cars used are of conventional form, but are equipped with external pipe coils and with fittings for admitting nitrogen gas. Oxygen is injurious to sodium, but nitrogen is not. So nitrogen is forced into the empty car, prior to filling, to drive out and displace the air. Then the molten sodium is pumped in and cold oil is circulated through the pipe coils to solidify or freeze it. All this takes 16 hours. To unload, hot oil is circulated in the coils, so that the sodium may be melted and pumped out. Unloading takes 13 hours.

This is the latest development in the bulk shipment of chemicals and the first depending on an eternally induced change from the solid to the liquid state and vice versa. It has solved too, one of the most difficult problems in connection with sodium handling—the keeping out of oxygen, hence air.

Packaging Conference in 4 "Volumes"

American Management Association has reprinted in leaflet form several of the papers presented on various phases of packaging at the recent Chicago Packaging Conference in Chicago. These include "Package Engineering," by Chilson; "The Package from the Marketing Viewpoint," by Larrabee; "Problems in Packing and Shipping," by Malcolmson; "Packaging Materials," by Ogden. The titles listed are by no means all of the articles which are included in the 4 booklets for all of the papers presented at the symposiums are included. Collectively they form a most valuable contribution to the general subject of packaging and all interested in packaging problems will find them invaluable. Offices of the Association are at 20 Vesey st., N. Y. City.

A Label Paster with New Advantages

An ultra modern label paster with many novel improvements has just been perfected by Alsop Engineering. New machine handles labels of all sizes, shapes and styles with maximum speed and ease. An oversize label feed table with an instantly adjustable label guide enables the operator to feed the labels into the machine with a minimum of time and effort.

There are no belts. A fully enclosed syncromesh gear drive results in smoother operation and further contributes toward making the machine positively foolproof in mechanical construction. The improved glue applicator and spreader lays a smooth, even coating of glue on the label insuring thorough and permanent adhesion of your labels on the containers. Where labels of different types require a glue coating of particular thickness or weight a micromatic adjustment enables you to instantly set the glue applicator to suit your immediate needs.

Savings in Ton Chlorine Cylinders Computed

In an article appearing in May issue of *Water Works and Sewerage*, p. 171, W. H. Lovejoy, superintendent of filtration for the City of Louisville reports on the savings due to a change from small to large chlorine containers. He says in part: New equipment installed for handling the large containers cost $1,312. Allowing for this cost plus interest and amortization, a saving of $9,132 was made by this change in the first three and one-half years of use.

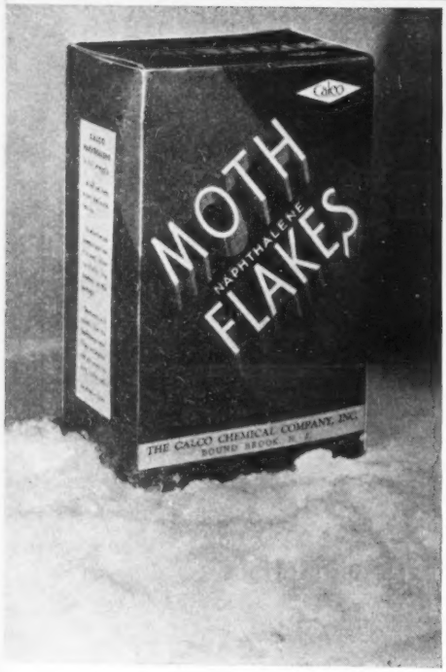
Savings on Use of Ton Chlorine Containers

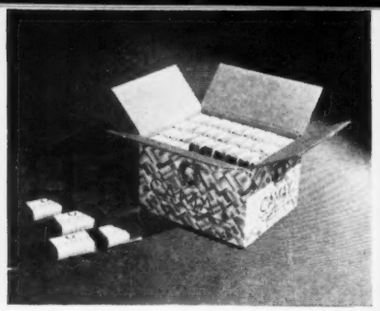
80,000 lbs. chlorine per year in 150 lb. cyls. @ 6.1c	$4,880.00
80,000 lbs. chlorine per year in ton cyls. @ 2.19c	1,752.00
Gross saving per year	$3,128.00
Cost of new handling equipment plus int. and amort.	1,456.00
Net saving for first year	$1,672.00
Gross saving for 2½ years less 6% int. and 5% amort.	7,460.00
Total net saving for 3½ years	$9,132.00

Bemis Bags in a Novel Use

A new use for Bemis bags is reported by Capt. Phillips H. Lord of the Seth Parker Expedition to the South Seas. Says the Captain: "You have no idea how much we appreciate Bemis Bags. I never before realized how handy it was to have a supply of bags on hand when you wanted them.

"We especially appreciate the rubber lined ones and I use them to put our guns in when we go fishing or out in the launch. Several nights I have been out in the life-boat all night with it raining torrents and the only dry things we had along were those in Bemis Bags."

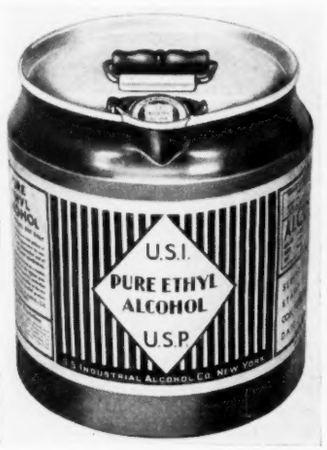




Left. To most of us in the industrial chemical field the name Calco is closely associated with intermediates, dyes, pharmaceuticals, etc. Yet, they are chemical-specialty minded at Bound Brook too. An exceptionally attractive carton is helping to make new sales records for Calco Moth Flakes. Center. Hinde & Dauch Paper artists suggest a new design to Procter & Gamble for a new container for Camay. If repackaging pays, says H. & D., why not more attention to the design of the shipping container? Right. A clever merchandising idea going over "big" in the 5 and 10 cent stores. The container is a capsule.

REGAL
RADIATOR
FLUSH-A-CLEANER
INSURES free circulation of water, eliminates rust, prevents over-heating - Keeps motor cool.
GUARANTEED harmless to cooling system and hose connections. A metal preservative. A harmless preparation; contains No injurious chemicals; can be used by anyone without danger.
DIRECTIONS- drop entire Capsule and contents into radiator while engine is running and WATER is HOT, drain after one day, flush and refill with fresh water. For New Car Performance, use Flush-A-Cleaner Every 1000 Miles.
Very good for cleaning all boilers and heating systems, also marine engines either fresh or salt water
REGAL SPECIALTY MFG. CO., NEW HAVEN, CONN.

A brush sealed into the can of enamel, and acting as the top, is this clever way of getting the user to buy Clix products. Particularly effective in the chain stores.

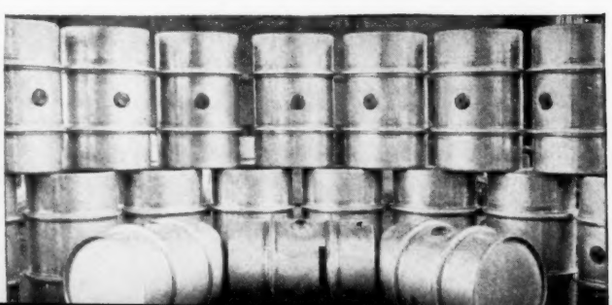


U. S. Industrial Alcohol brings out a 2-gallon container for the user who prefers smaller quantities, and, as with all U. S. I. containers, a worth-while merchandising job is done with the labels, type of container, etc.

"Not 3 men in a boat," as the story goes, but 3 husky men on the top of the new all-rubber drum or container made by General Tire & Rubber of Akron. Distribution in the U. S. and in Canada is in the hands of Maurice A. Knight of Akron, well known in the chemical and process fields as an outstanding producer of chemical stoneware. Shippers of acids and corrosive liquids will do well to investigate the possibilities of this drum.

Gem Products Sales of Camden bring out a new washing and bluing compound. It jells, it cleans, sweetens and is a germicide and deodorant. To package it, a Packomatic carton sealing machine, capable of filling and sealing 60 packages a minute, made by J. L. Ferguson Co., of Joliet, Ill.

Long investigation has proved both metal and oxwelded joints capable of resisting nitric acid. Commercially pure aluminum is used for this group of acid drums.—Courtesy, Linde Air Products, *Oxyacetylene Tips.*



U. S. Chemical Patents

A Complete Check-List of Products, Apparatus, Equipment, Processes

Agricultural Chemicals

Manufacture calcium arsenate insecticides; calcium arsenate being produced by a chemical reaction in water, including carrying out said reaction in presence of a fluorine compound. No. 1,996,016. Johnson Hagood, Avenel, N. J., to American Agricultural Chemical Co., Newark, N. J.

Art of concentrating phosphatic material in the form of a pulp to separate phosphatic from other constituents. No. 1,996,035. James T. Singleton, Pierce, Fla., to American Agricultural Chemical Co., Newark, N. J.

Production agents for destroying rust on cultivated plants, containing an amide of an aromatic sulfonic acid. No. 1,997,918. Adolf Steindorff, Robt. Kramer, Wilhelm Staudermann, and Michael Erlenbach, Frankfort-am-Main, Germany, to Winthrop Chemical Co., New York City.

Fusion process for opening up phosphate rock to render its values readily recoverable. No. 1,998,631. Ernest Little, New Brunswick, N. J.

Cellulose

Manufacture cellulose acetate. No. 1,995,732. Henri Louis Barthelemy, Rome, Ga., to Ruth-Aldo Co., Inc., New York City.

Production artificial materials; by dry spinning a solution of a cellulose derivative in a mixture of a volatile solvent and a higher boiling solvent into an evaporative medium charged with the vapors of a substance which is a non-solvent for the cellulose derivative. No. 1,996,102. Henry Dreyfus, London, England.

Production purified viscose solutions; using cellulose xanthogenate during process. No. 1,996,197. Ernst Freund, Vienna, Austria.

Method of and apparatus for manufacturing and treating strand materials. No. 1,996,272. Orton B. Brown and Ernest P. Cook, Berlin, N. H., to Brown Co., Berlin, N. H.

Method bleaching cellulosic material; using free chlorine and sulfur dioxide. No. 1,996,363. John Campbell and Lancelot O. Rolleston, Glens Falls, N. Y., to International Paper Co., New York City.

Production cellulosic products from wood, etc.; first extracting resins therefrom, with final subjection to a chemical pulping process. No. 1,996,797. Henry Dreyfus, London, England.

Production artificial filaments from viscose solution; first forming filaments in an acid coagulating bath. No. 1,996,989. Arnold Bernstein, Mannheim, Germany, to Zellstofffabrik-Waldhof, Mannheim-Waldhof, Germany.

Manufacture alpha cellulose from bamboo. No. 1,997,153. Jose Sala Pou, Barcelona, Spain.

Production artificial filaments of the rayon type, having unusual degree of resistance to moisture and increased wet strength; consisting of an acetone-soluble cellulose acetate having a precipitation value of at least 90%. No. 1,997,316. Paul C. Seel, Rochester, N. Y., to Eastman Kodak Co., Rochester, N. Y.

Preparation cellulose organic ester composition containing pinacol. No. 1,997,319. Henry B. Smith, Rochester, N. Y., to Eastman Kodak Co., Rochester, N. Y.

Direct production of acetone-soluble cellulose esters. No. 1,997,326. Russell H. Van Dyke, Chas. S. Webber, and Cyril J. Staud, Rochester, N. Y., to Eastman Kodak Co., Rochester, N. Y.

Method purifying carbohydrate solutions obtained in the saccharification of cellulose-containing materials. No. 1,997,545. Eduard Faerber, Heidelberg, and Hugo Koch and Helmut Urban, Mannheim-Rheinau, Germany, to Holzhydrolyse Aktiengesellschaft, Mannheim-Rheinau, Germany.

Manufacture artificial filaments; extruding a solution of a derivative of cellulose in an organic solvent into a stationary precipitating bath. No. 1,997,632. Camille Dreyfus, New York City, and Wm. Whitehead, Cumberland, Md., to Celanese Corp. of America, a corporation of Delaware.

Preparation low viscosity cellulose nitrate; reducing regenerated cellulose sheeting to small crumpled pieces of single thicknesses and nitrating. No. 1,997,766. Paul Boyd Cochran, Parlin, N. J., Maurice Valentine Hitt, Wilmington, Del., and Leland Van Taylor, Raritan Township, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Process treating waste liquors from cellulose digestion to regenerate their alkali metal compound content. No. 1,997,773. Gustaf Haglund, Stockholm, Sweden, to Patentaktiebolaget Grondal-Ranen, Stockholm, Sweden.

Apparatus and process for spinning of cuprammonium filaments. No. 1,997,930. Hugo Hofmann, Johnson City, Tenn., to American Bemberg Corp., New York City.

Method changing solubility characteristics of a lower fatty acid ester of cellulose without dissolving same. No. 1,998,267. Auguste Florentin Bidaud, Serezin-du-Rhone, France, to Du Pont Rayon Co., New York City.

Improving cellulose; by treatment with alkali, and bleaching with chlorine and an active oxygen. No. 1,998,389. Emil Scheller, Lorsbach in Taunus, Germany.

Preparation cellulose ethers; adding caustic alkali to a slurry of cellulose, water and an etherifying agent. No. 1,998,463. James McGrath, Ardrossan, Scotland, to Imperial Chemical Industries, Ltd., London, England.

Process for mercerizing cellulosic fibres; subjecting material to treatment with alkaline mercerizing lyes containing phenols and alicyclic carboxylic acids. No. 1,998,550. Heinrich Lier, Basel, Switzerland, to Chemical Works formerly Sandoz, Basel, Switzerland.

Chemical Specialties

Manufacture impregnated articles; impregnating a base in presence of a wetting-out agent with an aqueous medium containing a dispersed water-proofing agent for base. No. 1,995,623. Geo. A. Richter, Berlin, N. H., to Brown Co., Berlin, N. H.

Preparation a cleaning and polishing composition; emulsifying water insoluble wax and rosin oil with a solution of soap and an animal or vegetable oil. No. 1,995,862. Herbert Spencer Polin, New York City, to Polin, Inc., New York City.

Production cementitious material, capable of setting when mixed with water. No. 1,995,963. Michele Croce, Kenmore, N. Y., to Certain-teed Products Corp., New York City.

Preparation a harmless insecticide and fungicide composition; consisting of an oil-water emulsion. No. 1,996,100. Elmer R. de Ong, Berkeley, Cal., and Eugene B. Smith, Jacksonville, Fla., to E. W. Colledge, General Sales Agents, Inc., Jacksonville, Fla.

Production anti-freeze composition; being solution formed of calcium chloride, aluminum chloride, glycerin, and water. No. 1,997,735. Francis L. Lund, Ogden, Utah.

Preparation a herbicidal composition composed mostly of ammonium thiocyanate. No. 1,997,750. Vincent Sauchelli, Pittsburgh, Pa., to The Koppers Company of Delaware, Pittsburgh, Pa.

Preparation for treating bottoms of ships, etc., for destroying animal and vegetable matter; using mixture of linseed oil and red lead with a poison comprising the sap of a tree such as the Candelilla and the Iza tree. No. 1,997,794. Isauro Ibanez, Mazatlan, Mexico.

Plastic sealing cement; consisting of long fibre asbestos shreds, asphalt, and rosin, intermingled with the application of heat. No. 1,997,924. Elbie D. Curtis, Bingham, Me.

Preparation metal polish containing a substance included in the group of maleic acid and acid salts of maleic acid as an active constituent. No. 1,997,989. Heinrich W. Witzel, Ingram, Pa., to American Cyanamid & Chemical Corp., New York City.

Preparation seed disinfectant; a material selected from a class consisting of cadmium cyanide, cadmium di-isopropyl dithiophosphate, cadmium cyanamid, cadmium xanthate and cadmium phenyl cyanamid. No. 1,998,092. Vartkes Migrdichian, Elizabeth, N. J., to American Cyanamid Co., New York City.

Coatings

Apparatus provided with a protective coating for handling molten metal. No. 1,995,349. Herbert M. E. Heinecke, Elgin, Ill., to Western Electric Co., New York City.

Preparation coating composition, comprising phosphoric acid, a solution of a varnish base in hydrocarbon solvent in which phosphoric acid is insoluble, and an organic solvent for the acid. No. 1,995,954. Herbert O. Albrecht, Flint, Mich., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Preparation asphaltic coating composition; comprising asphalt, an organic solvent, and a polyhydric alcohol-polybasic acid resin. No. 1,995,957. Harold James Barrett, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Preparation a fire extinguishing liquid paint composition for inflammable material; comprising an oxidation-inhibitor at combustion temperature in the form of arsenious metarsenite. No. 1,996,089. Claude S. Thompson, Seattle, Wash., to Thompson Paint Mfg. Co., Seattle, Wash.

Production a lacquer comprising a cellulose ester and a synthetic resin. No. 1,996,570. Oscar A. Cherry, Chicago, Ill., to Economy Fuse & Mfg. Co., Chicago, Ill.

Preparation cellulose lacquer composition. No. 1,996,715. Charles Bogin, Terre Haute, Ind., to Commercial Solvents Corp., Terre Haute, Ind.

Preparation coating composition; including chlorinated rubber, a chlorinated diphenyl, and a solvent. No. 19,526. Reissue. Wm. Koch, Wilmington, Del., to Hercules Powder Co., Wilmington, Del.

Production a printing lacquer; using nitrocellulose, ester gum, xylol, fenchone, dibutyl phthalate, and pigment. No. 1,996,846. David R. Wiggam, Kenvil, N. J., to Hercules Powder Co., Wilmington, Del.

Moist-proof, transparent, non-greasy and non-tacky composition; consisting of nitrocellulose, a plasticizer and a wax. No. 1,997,105. Ralph T. K. Cornwell, Fredericksburg, Va., to Sylvania Industrial Corp., Fredericksburg, Va.

Coating composition; using a cellulose derivative, wax, a plasticizer, and non-resinous wax solvent of blown oil. No. 1,997,106. Ralph T. K. Cornwell, Fredericksburg, Va., to Sylvania Industrial Corp., Fredericksburg, Va.

Production a lacquer comprising a cellulose acylate, which is insoluble in toluene, dissolved in an organic solvent consisting of toluene and acetone. No. 1,997,337. Carl J. Malm, Rochester, N. Y., and Chas. E. Waring, Dayton, O., to Eastman Kodak Co., Rochester, N. Y.

Manufacture a wrapping tissue; comprising a base thinly coated on both sides with a composition of pyroxylin with a nitrogen content, a plasticizer, and a wax. No. 1,997,583. Maurice Valentine Hitt, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Wrapping tissue comprising a unitary, integral and non-separable material consisting of a film or sheet of a cellulose derivative coated on both sides with a moistureproofing composition comprising a cellulose derivative, a gum, a wax, and a plasticizer. No. 1,997,857. Wm. Hale Church, Buffalo, N. Y., to Du Pont Cellophane Co., New York City.

Manufacture flexible sheet material; having a coating comprising an alkyd resin, and particles of abrasive material imbedded in coating. No. 1,998,303. Lawrence E. Barringer, Schenectady, N. Y., to General Electric Co., New York City.

Manufacture baking enamel; comprising an aqueous solution of free polyhydric alcohol, a water-soluble salt of a polyhydric alcohol- polycarboxylic acid resin, and a volatile base. No. 1,998,744. Richard T. Ubben, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Coal Tar

Preparation aryl-ketones and phenol esters. No. 1,995,402. Siegfried Skraup, Wurzburg, Germany, to Rheinische Kampfer-Fabrik G.m.b.H., Dusseldorf-Oberkassel, Germany.

Wood treatment process; introducing SO_2 into the wood, then impregnating with a preservative liquid. No. 1,995,499. Ira H. Derby, and Francis Edward Cislak, Indianapolis, Ind., to Peter C. Reilly, Indianapolis, Ind.

Process for treating coal; by application of a dosage of an oily liquid. No. 1,995,603. Noel Cunningham, Bethlehem, Pa.

Manufacture anthraquinone derivatives. No. 1,995,806. Hermann Hauser, Basel, and Max Bommer, Riehen, near Basel, Switzerland, to Society of Chemical Industry in Basle, Basel, Switzerland.

Preparation chloro-and bromo-derivatives of 2-aminonaphthalene-1-sulfonic acid. No. 1,995,929. Max Lange, Frankfort-am-Main, and Theodor Jacobs, Wiesbaden, Germany, to General Aniline Works, Inc., New York City.

Production hydroxy-alkyl compounds. No. 1,996,003. Heinrich Dehnert, Oggersheim, and Willi Krey, Uerdingen, Germany, to I. G., Frankfort-am-Main, Germany.

Process refining naphthalene; by distilling it from a mixture of impure naphthalene and an acid sulfate salt. No. 1,996,262. James D. Todd and Jay C. Owens, Chicago, Ill., to Sherwin-Williams Co., Cleveland, O.

Apparatus for distilling coal or other carbonaceous material. No. 1,996,650. Franz Puening, O'Hara Township, Allegheny County, Pa.

Coking apparatus. No. 1,996,651. Franz Puening, O'Hara Township, Allegheny County, Pa.

Preparation phenol. No. 1,996,744. Edgar C. Britton, Midland, Mich., to Dow Chemical Co., Midland, Mich.

Preparation a mixture of alpha and beta naphthols; reacting a monochlornaphthalene with aqueous sodium hydroxide under pressure. No. 1,996,745. Edgar C. Britton and Horace A. Stearns, Midland, Mich., to Dow Chemical Co., Midland, Mich.

Preparation of a 1-aroylamino-6-amino-anthraquinone. No. 1,996,959. Donald P. Graham, So. Milwaukee, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Chlorination of aromatic compounds; using chlorine and sulfuric acid during process. No. 1,997,226. Julius Mueller, Mannheim, Germany, to General Aniline Works, Inc., New York City.

Preparation alkyl aryl ketones. No. 1,997,213. Philip H. Groggins and Ray H. Nagel, Washington, D. C., to Henry A. Wallace, Secretary of Agriculture of the U. S. A.

Production a ring compound by fusing acenaphthene and phthalic anhydride with anhydrous aluminum chloride. No. 1,997,305. Otto B. May, South Orange, N. J.

Preparation hydroxydiphenylene compounds. No. 1,997,744. Bruno Putzer, Wuppertal-Elberfeld, and Friedrich Muth, Leverkusen-I.G. Werk, Germany, to General Aniline Works, Inc., New York City.

Production of hydroquinones; vaporizing quinone at pressures below atmospheric out of contact with reactive gases and introducing the quinone vapors into a re-circulating system of reducing agent. No. 1,998,177. Harold Von Bramer and John W. Zabriskie, Kingsport, Tenn., to Eastman Kodak Co., Rochester, N. Y.

Improved process for liquefying solid carbonaceous substances of coal, etc.; by adsorbing Prussian blue from a colloidal solution on the solid substance to be hydrogenated. No. 1,998,212. Hein Israel Waterman, Delft, Netherlands, to Shell Development Co., San Francisco, Cal.

Preparation dibenzothiazyldisulfide from 2-mercaptobenzothiazole; using nitric acid in process. No. 1,998,240. Gerhard Kallner, Ida-und Marienhutte, Germany, to Silesia Verein Chemischer Fabriken, Ida- und Marienhutte, near Saarau, Silesia, Germany.

Process inverting hydrazo-benzenes; in one step finely dividing the hydrazo-benzene and coating surface of the particles with a protective colloid. No. 1,998,488. Wm. S. Calcott, Penns Grove, and Fred. B. Downing and Norman C. Somers, Carneys Point, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Preparation sulfonic acid of the benzene series. No. 1,998,563. Richard Stusser, Cologne-Deutz-am-Rhine, Germany, to General Aniline Works, New York City.

Conversion naphthalene into liquid hydrocarbons of the benzene series having an unchanged number of carbon atoms in the molecule. No. 1,998,595. Walter Speer and Walter Flemming, Ludwigshafen-am-Rhine, Germany, to I.G., Frankfort-am-Main, Germany.

Preparation 4-nitro-2-amino-toluene by nitrating o-toluidine in concentrated sulfuric acid No. 1,998,795. John M. Tinker, So. Milwaukee, Wis., and Willard C. Stewart, Preston, Iowa, to E. I. du Pont de Nemours & Co., Wilmington, Del.

Preparation benzoic acid and benzoates by the oxidation of toluene with the aid of aqueous solutions of hexavalent chromium. No. 1,998,925. Jules Emile Demant, Trosly-Breuil, France, to Bozel-Maletra Societe Industrielle de Produits Chimiques, Cuise-Lamotte (Oise), France.

Dyes

Preparation an azo dyestuff. No. 1,995,553. Richard Stusser, Cologne-Deutz, Germany, to General Aniline Works, Inc, New York City.

Reducing a vat dyestuff to its leuco compound by means of carbon bisulfide in the presence of a tertiary organic base and a compound. No. 1,995,557. Ludwig Zeh and Wilhelm Bauer, Leverkusen-Wiesdorf, and Bernhard Bollweg, Leverkusen-I.G. Werk, Germany, to Durand & Huegenin A.-G., Basel, Switzerland.

Preparation water soluble azo dyestuffs. No. 1,995,564. Heinrich Clingestein, Cologne-am-Rhine, and Friedrich Schubert, Leverkusen-I. G. Werk, Germany, to General Aniline Works, New York City.

Production disazo dyestuffs. No. 1,995,902. Wilhelm Scheurer and Georg Niemann, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, New York City.

Production azo dyestuff of the aromatic series free from arsenic and containing as end coupling component an 8-aminoquinoline. No. 1,995,928. Max Albert Kunz, Mannheim, and Hans Krzikalla and Walter Limbacher, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., New York City.

Production water-insoluble monoazo-dyestuffs and fiber dyed therewith. No. 1,995,932. Leopold Laska and Arthur Zitscher, Offenbach-am-Main, Ernst Fischer, Frankfort-am-Main, and Wilhelm Lamberz, Leverkusen-Wiesdorf, Germany, to General Aniline Works, New York City.

Production water-insoluble monoazo-dyestuffs, and fiber dyed therewith. No. 1,995,933. Leopold Laska and Arthur Zitscher, Offenbach-am-Main, Ernst Fischer, Frankfort-am-Main, and Wilhelm Lamberz, Leverkusen-Wiesdorf, Germany, to General Aniline Works, New York City.

Production a new dyestuff, adapted to color oils; being an intimate admixture of mahogany sulfonic bodies, moisture, and a water soluble dyestuff. No. 1,996,391. Joseph Straus, New York City.

Production a monohydroxychrysene from the monoaminochrysene obtained by mononitrating chrysene and reducing the nitro compound so formed. No. 1,996,475. Walter Kern, Sissach near Basel, Switzerland, to Society of Chemical Industry in Basle, Basel, Switzerland.

Preparation water-insoluble azo dyestuff. No. 19,527. Reissue. August Leopold Laska and Arthur Zitscher, Offenbach-am-Main, Germany, to I. G., Frankfort-am-Main, Germany.

Production dyestuffs of the thiazine series. No. 1,996,867. Richard Herz, Frankfort-am-Main, and Werner Zerweck and Wilhelm Hechtenberg, Frankfort-am-Main-Fechenheim, Germany, to General Aniline Works, New York City.

Production halogenated dyestuffs of the indigo group. No. 1,997,160. Heinrich Ulrich and Karl Saurwein, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., New York City.

Production n-dihydro-1,2,1′,2′-anthraquinone-azine and its derivatives. No. 1,997,610. Merville S. Thompson, deceased, late of Penns Grove, N. J., by Marian Clough Thompson, executrix, Media, Pa., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Preparation an azo dye. No. 1,998,507. Henry Jordan and Crayton Knox Black, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Preparation acid dyestuff of the anthraquinone series. No. 1,998,546. Georg Kraenzlein and Ernst Diefenbach, Frankfort-am-Main, Hochst, Germany, to General Aniline Works, New York City.

Explosives

Method of graining a crystalline organic explosive compound. No. 1,996,146. Willard de C. Crater, Succasunna, N. J., to Hercules Powder Co., Wilmington, Del.

Fine Chemicals

Preparation chlorocresols. No. 1,995,568. Constantin Jacobi and Bertram Wolf, Frankfort-am-Main-Griesheim, Germany, to I. G., Frankfort-am-Main, Germany.

Preparation the nitrite of 2-chloro-6-nitrobenzaldimercurioxide, obtained by reacting with nitrous acid. No. 1,996,005. Emeric Havas, So. Milwaukee, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Preparation 2-chloro-6-nitrobenzaldimercurioxide; obtained by reacting with mercuric oxide in alkaline solution. No. 1,996,006. Emeric Havas, So. Milwaukee, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Preparation 2-chloro-6-nitrobenzaldoxime. No. 1,996,007. Emeric Havas, So. Milwaukee, Wis, to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production ionones by the isomerization of pseudoionones. No. 1,996,116. Walter Christian Meuly, New Brunswick, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production a sulfonated heterocyclic hydrocarbon sulfur compound. No. 1,996,334. Eric T. Hessle, Lockport, Ill., to Thiophene Products Co., Chicago, Ill.

Manufacture terpenes; reacting a material having a body of the group formed by pinene and nopinene with less than the equivalent quantity of an inorganic compound of acid reaction. No. 1,996,558. Fritz Ulffers and Rudolf Erbe, Eberswalde, Germany, to Schering-Kahlbaum A.-G., Berlin, Germany.

Manufacture olefine oxides; first subjecting a mixture of an olefine chlorhydrin and an alkali at superatmospheric pressure to a temperature between about 70° and about 250°C. No. 1,996,638. Edgar C. Britton, Howard S. Nutting, and Peter S. Petrie, Midland, Mich., to Dow Chemical Co., Midland, Mich.

Manufacture an aryl magnesium chloride of the benzene series; reacting a chloro-benzene compound with metallic magnesium under superatmospheric pressure. No. 1,996,746. Edgar C. Britton and Harold R. Slagh, Midland, Mich., to Dow Chemical Co., Midland, Mich.

Treatment photographic films; using formaldehyde, tannic acid, and glycerine, in solution. No. 1,997,269. Victor A. Stewart, New York City, to Louis A. Solomon, New York City.

Manufacture diarylamine-haloarsines; reacting arsenic trioxide and a halogen acid salt of a diarylamine, adding an inorganic anhydrous acid reacting halide as a catalyst to mixture, and heating. No. 1,997,304. Wm. M. Lofton, Jr., Chicora, and Samuel G. Burroughs, Pittsburgh, Pa., to Pennsylvania Coal Products Co., a corporation of Penna.

Process of diazo photo-printing; first preparing a water solution of a light-sensitive desmotropic anti-diazo component and an azo dye-forming coupling component. No. 1,997,507. Vladimir C. Akintievsky, New York City.

Manufacture photographic films; by applying to Pergamyn paper a layer of varnish, and further application to this layer of a photographically light-sensitive layer. No. 1,997,745. Max Renker, Duren Rheinland, Germany.

Production substituted piperidino-alkyl benzoates. No. 1,997,828. Samuel M. McElvain, Madison, Wis.

Method purifying a crude water-insoluble metal iodide which is contaminated with other water-insoluble halides. No. 1,998,010. Chas. W. Girvin, Long Beach, Cal., to Deepwater Chemical Co., Los Angeles, Cal.

Purifying crude silver iodide; treating crude material with a ferrous iodide solution. No. 1,998,014. Sheldon B. Heath and Maurel F. Ohman, Midland, Mich., to Dow Chemical Co., Midland, Mich.

Photographic material, comprising a support provided with a light-sensitive emulsion, a color filter applied to surface of emulsion; filter consisting of a mixture of a dye and a colloid. No. 1,998,530. Arpad von Biehler, Dessau in Anhalt, Germany, to Agfa Ansco Corp., Binghamton, N. Y.

Preparation salicylic acid derivative. No. 1,998,750. Herman A. Bruson, Germantown, and Otto Stein, Drexel Hill, Pa., to Resinous Products & Chemical Co., Phila., Pa.

Preparation 4-nitro-2-amino-anisole; using sulfuric acid, a nitrating agent, and an aryl sulfonic acid compound in process. No. 1,998,794. John M. Tinker and Louis Spiegler, So. Milwaukee, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Process developing an exposed blue print; blue coloring being imparted to print by oxidation of ferrous ferrocyanide into the insoluble blue ferric ferrocyanide; by contacting print with a solution of urea peroxide. No. 1,998,883. Jos. S. Reichert, Niagara Falls, N. Y., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Glass, Ceramics

Method fining glass; adding to batch not over 2% of sulfur and salt cake, and melting the batch. No. 1,995,952. Wm. C. Taylor, Corning, N. Y., to Corning Glass Works, Corning, N. Y.

Industrial Chemicals

Production a polymeric carbonate of a dihydric primary alcohol of more than 2 carbon atoms. No. 1,995,291. Wallace H. Carothers, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Apparatus for manufacture sulfuric acid. No. 1,995,292. Cyril B. Clark, Scarsdale, N. Y., to American Cyanamid & Chemical Corp., New York City.

Method of simultaneously conducting an exothermic catalytic reaction and the removal of dust, etc., from the gases undergoing catalysis. No. 1,995,293. Cyril B. Clark, Scarsdale, N. Y., to American Cyanamid & Chemical Corp., New York City.

Method removing titanium from a material comprising titanium oxide. No. 1,995,334. Svend S. Svendsen, Madison, Wis., to C. F. Burgess Laboratories, Madison, Wis.

Apparatus for manufacture of basic alum. No. 1,995,343. Arthur Fleischer, Hartford, Conn., to Kalunite Co., Phila., Pa.

Manufacture asphalt emulsion. No. 1,995,346. Arthur Ludwick Halvorsen, Perth Amboy, N. J.

Production a catalytic material containing a manganite of a metal. No. 1,995,353. Leslie G. Jenness, Brooklyn, N. Y., to Davis Emergency Equipment Co., New York City.

Apparatus and method of converting sulfur dioxide to sulfur trioxide by the contact process. No. 1,995,360. Henry F. Merriam, West Orange, N. J., to General Chemical Co., New York City.

Method forming a solid fuel briquette; using anthracite culm, a waterproofing substance, sodium silicate, and silicic acid gel. No. 1,995,366. Foster Dee Snell, Brooklyn, N. Y.

Apparatus for manufacture of aluminum sulfate. No. 1,995,401. Garnett L. Scott, Wilmington, Del., to General Chemical Co., New York City.

Preparation a denatured ethyl ester containing as a denaturant organic sulfur compounds. No. 1,995,539. Wm. H. Hampton, Berkeley, Cal., to Standard Oil Co. of Cal., San Francisco, Cal.

Cyclic process of removing hydrogen sulfide from fuel gas. No. 1,995,545. Michael J. Leahy, Fort Worth, Texas.

Production cupric sulfate. No. 1,995,555. Hans Weidmann, Frankfort-am-Main, Germany, to American Lurgi Corp., New York City.

Preparation rutile from anatase. No. 1,995,580. Joachim Rockstroh, Cologne-Deutz, Friedrich Raspe, Leverkusen-I. G. Werk, and Heinrich Kircher, Leverkusen-Schlebusch, Germany to I. G., Frankfort-am-Main, Germany.

Method purifying secondary alcohols containing sulfur compounds. No. 1,995,597. Francis M. Archibald and Clayton M. Beamer, Elizabeth, N. J., to Standard Alcohol Co.

Method fixing dust; through use of a water solution of alkali sulfonate derived from minera loil, a hygroscopic material, and a plasticizer. No. 1,995,598. Francis M. Archibald, Elizabeth, N. J., to Standard Oil Development Co., Bayways, N. J.

Production calcium formate. No. 1,995,607. Max Enderli, Oestrich, Germany, to Rudolph Koepp & Co., Chemische Fabrik A. G., Oestrich, Germany.

Improved method for removing catalyst poisons from a mercaptan. No. 1,995,612. John R. Huffman, Elizabeth, and James M. Whiteley, Jr., Roselle, N. J., to Standard Oil Development Co, Bayways, N. J.

Method oxidizing compounds containing the furane nucleus to dibasic straight chain acids or anhydrides containing four carbon atoms. No. 1,995,614. Alphons O. Jaeger, Crafton, Pa., to American Cyanamid & Chemical Corp., New York City.

Apparatus for and improvement in carrying out chemical processes at elevated temperatures. No. 1,995,647. Mathias Pier, Heidelberg, and Walter Dinkler, Mannheim, Germany, to I. G., Frankfort-am-Main, Germany.

Manufacture hydrocarbon products containing oxygen. No. 1,995,752. Alfred Schaarschmidt, deceased, late of Berlin-Charlottenburg, Germany, by Erna Magda Irmgard Schaarschmidt, administratrix, Berlin, Germany, to Antares Trust Registered, Vaduz Liechtenstein.

Manufacture hydrocarbon products containing oxygen. No. 1,995,753. Alfred Schaarschmidt, deceased, late of Berlin-Charlottenburg, Germany, by Erna Magda Irmgard Schaarschmidt, administratrix, of Berlin, Germany, to Antares Trust Registered, Vaduz, Liechtenstein.

Production of alkyl substituted aryl hydrocarbons. No. 1,995,827. Chas. A. Thomas, Wayne, Pa., to Sharples Solvents Corp., Phila., Pa.

Apparatus for removing fibrous material from liquids. No. 1,995,829. William S. Wise, Hartford, Conn.

Method catalytically absorbing olefines having at least 3 carbon atoms and at least one double bond in the molecule in a strong acid. No. 1,995,908. Adrianus Johannes van Peski, Amsterdam, Netherlands, to Shell Development Co., San Francisco, Cal.

Production an artificial fuel. No. 1,995,911. John Wysocki and Wm. R. Rich, Balto., Md., to U. S. Industrial Alcohol Co., New York City.

Apparatus for and method of manufacturing carbureted water gas, using heavy oil. No. 1,995,921. Edwin L. Hall, Phila., Pa., to United Gas Improvement Co., Phila., Pa.

Process reacting isobutanol and CO; thereby producing trimethyl acetic acid. No. 1,995,930. Alfred T. Larson, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Process concentrating a dilute aqueous water-soluble fatty acid, extracting the dilute acid with isopropyl ether. No. 1,995,965. Jos. G. Davidson, New York City, and Jos. J. Schaefer, Niagara Falls, N. Y., to Carbide & Carbon Chemicals Corp., New York City.

Acetylene generator. No. 1,995,968. Maurice P. De Motte, Indianapolis, Ind., to Oxweld Acetylene Co., a corporation of W. Va.

Method reacting mercaptothiazoles with primary amines and formaldehyde. No. 1,996,011. Wm. Earl Messer, New Haven County, Conn., to U. S. Rubber Co., New York City.

Apparatus for handling, drying, and processing materials. No. 1,996,020. Alpheus O. Hurxthal, Phila., Pa., to Proctor & Schwartz, Inc., Phila., Pa.

Production sound absorbing composition; using mineral wool, glue, cooked starch, pyrophyllite, beta naphthol, and aluminum sulfate. No. 1,996,032. Carlisle K. Roos, Wheaton, Ill., to U. S. Gypsum Co., Chicago, Ill.

Production a plastic sound absorbing composition; comprising particles of granulated mineral wool, and a binder consisting of starch gel and Karaya gum. No. 1,996,033. George D. King, Chicago, Ill., to U. S. Gypsum Co., Chicago, Ill.

Process cooling; transferring heat from the material to be cooled to a sludge containing sodium chloride and an excess of both hydrated and anhydrous sodium sulfate. No. 1,996,053. Leroy G. Black and Mortimer M. Rich, Trona, Cal., to American Potash & Chemical Corp., Trona, Cal.

Production fumigant; process for generation of hydrocyanic acid. No. 1,996,065. Joseph W. Dunning, Niagara Falls, N. Y., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Recovery acetylene from gases containing same; scrubbing gases with a liquid comprising an ester of an aliphatic polybasic acid and a monohydric alcohol having 1-3 carbon atoms. No. 1,996,088. Guy B. Taylor, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Manufacture oxygenated organic compounds. No. 1,996,101. Henry Dreyfus, London, England.

Manufacture alkyl fluorides; by causing hydrogen fluoride to react with an olefine of more than 3 carbon atoms under superatmospheric pressure. No. 1,996,115. Wilbur Arthur Lazier, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production a transfer fluid; comprising a monohydric alcohol, a water soluble substituted dihydric alcohol, and water. No. 1,996,125. Philip A. Shillenn, Camden, N. J., to Radio Corp. of America, a corporation of Delaware.

Production carbides and making acetylene therefrom. No. 1,996,185. Robert G. Wulff, Los Angeles, Cal., to Wulff Process Co., Los Angeles, Cal.

Continuous production of glycol by the decomposition of a chlorhydrin in the presence of water and with the use of non-caustic alkali. No. 1,996,193. Albert Ernest Dunstan, London, and Stanley Albert Birch, Sunbury-on-Thames, England, to Anglo-Persian Oil Co., Ltd., London, England.

Production chlorpicrin; conducting process with a chlorinating agent whose principal effective constituent is hypochlorous acid. No. 1,996,388. William D. Ramage, Pittsburg, Cal., to Great Western Electro-Chemical Co., San Francisco, Cal.

Production acetone, butyl alcohol, and ethyl alcohol; by fermentation. No. 1,996,428. James F. Loughlin, Milwaukee, Wis.

Preparation acyloins containing 24 or more carbon atoms; reacting a solution of an ester of a fatty acid, having 12 or more carbon atoms, with a molten alkali metal. No. 1,996,471. Virgil L. Hansley, Niagara Falls, N. Y., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Carbonizing apparatus. No. 1,996,649. Franz Puening, O'Hara Township, Allegheny County, Pa.

Preparation valuable compounds from the waste products obtained in the refining of cracked mineral oils. No. 1,996,692. Waclaw von Piotrowski and Jozef Winkler, Drohobycz, Poland.

Process stabilizing trichlorethylene; by addition of caffeine. No. 1,996,717. Paul Johnson Carlisle, Niagara Falls, N. Y., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Catalytic production of condensation products of aromatic, mono- and binuclear hydrocarbons. No. 1,996,738. Otto Drossbach and Ernst Roell, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Catalytic production of condensation products of aromatic mono- and binuclear hydrocarbons. No. 1,996,739. Otto Drossbach and Ernst Roell, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Manufacture of an aliphatic anhydride. No. 1,996,755. Henry Dreyfus, London, England.

Production and purification of sulfur dioxide. No. 1,996,764. Wm. Morris Hibbs, Wilmington, N. C.

Manufacture stable sodium hypochlorite. No. 1,996,769. Carl W. Kuehne, Elizabeth, N. J.

Production metal carbonyls; acting with CO on a material comprising a sulfidic compound of at least one metal capable of forming a metal carbonyl. No. 1,996,833. Leo Schlecht, Ludwigshafen-am-Rhine, and Emil Keunecke, Oppau, Germany, to I. G., Frankfort-am-Main, Germany.

Manufacture waterproof abrasives; comprising particles of a solid abrasive material and, as a binder, a hardened resinous condensation product of a methylol compound of urea. No. 1,996,911. Karl Eisenmann, Erich Scholz, and Karl Wolf, Ludwigshafen-am-Rhine, Germany, to Unyte Corp., New York City.

Catalyst comprising a metal of the group of iron, nickel and cobalt; said catalyst being free of metal oxides. No. 1,997,135. Edouard Robert William de Mahler, Nice, France.

Manufacture benzine-like products from low boiling hydrocarbons of the ethylene series, by subjection to a polymerization reaction. No. 1,997,144. Max Hofsasz, Amsterdam, Netherlands, to Shell Development Co., San Francisco, Cal.

Recovery hydrocarbons from gases containing substances with a tendency to polymerize. No. 1,997,145. Willy Herbert, Frankfort-am-Main, Germany, to American Lurgi Corp., New York City.

Method solidifying CO_2. No. 1,997,151. Guido Maiuri, Aldwych, London, England, to Maiuri Refrigeration Patents, Ltd., London, England.

Catalytic production of esters; treatment fatty acids other than formic. No. 1,997,172. Stefan Goldschmidt, Berlin, Germany, and Erich Littmann, Haifa, Palestine, to Kessler Chemical Corp., New York City.

Treatment asphalt to prevent oxidation and deterioration; by addition of wood tar pitch. No. 1,997,261. Chas. D. Lowry, Jr., to Universal Oil Products Co., Chicago, Ill.

Apparatus for forming single nuclei crystals from a liquor. No. 1,997,277. Wm. E. Burke, Wm. H. Allen, Wm. A. Gale, and Chas. F. Ritchie, Trona, Cal., and Robt. B. Peet, Ithaca, N. Y., to American Potash & Chemical Corp., Trona, Cal.

Manufacture brick having a light-weight burned clay body, the walls of cavities of said body being covered by a coating of fused silica and an alkali. No. 1,997,282. Chas. Weigel, Hebron, N. D.

Manufacture a light-sensitive device comprising selenium containing metallic sulfides. No. 1,997,479. Vilmos Ervin Burg, Karlsruhe-Baden, Germany, to Telefunken Gesellschaft fur Drahtlose Telegraphie m. b. H., Berlin, Germany.

Reduction of sulfur dioxide; first step, introducing carbonizable coal into reduction zone. No. 19,531. Reissue. Raymond C. Benner, Niagara Falls, N. Y., and Alfred Paul Thompson, Pittsburgh, Pa., to General Chemical Co., New York City.

Apparatus and process for oxidizing metal sulfides and making sulfur dioxide. No. 19,532. Reissue. Horace Freeman, Three Rivers, Que., Canada, to Nichols Engineering & Research Corp. of Canada, Ltd.

Revivifying spent green acid soap which has been exhausted as a treating reagent for lubricating oils; using sulfuric acid and a light hydrocarbon oil during process. No. 1,997,566. Robt. E. Beard and Edw. N. Roberts, Casper, Wyo., to Standard Oil Co., Chicago, Ill.

Method and means for identifying brands of liquid hydrocarbons; using mixture of Oil Orange concentrated, Oil Red 3B, and Alizarine paste dry. No. 1,997,670. Geo. L. Armour, Brooklyn, N. Y.

Purification of caustic liquors; adding to the liquor a purifying reagent selected from the oxide and hydroxide of magnesium group. No. 1,997,691. Wilmer H. Koch, Niagara Falls, N. Y., to Mathieson Alkali Works, Inc., New York City.

Saturator for production of ammonium salts and process for their manufacture. No. 1,997,757. Wm. Tiddy, Scarsdale, N. Y., to Semet-Solvay Engineering Corp, New York City.

Briquetting machine. No. 1,997,813. John P. Cullen, Bay City, Mich., to Industrial Brownhoist Corp., Bay City, Mich.

Preparation an emulsion comprising an organic water immiscible substance in the dispersed phase, water in the continuous phase, and viscose as emulsifying agent. No. 1,997,868. Harold L. Levin, Rutherford, N. J., to The Patent and Licensing Corp., New York City.

Method forming a dielectric insulating composition and lining a wall with same; using a glue and a colloidal solution in process. No. 1,997,874. Laurence E. Power, Milwaukee, Wis., to Allen-Bradley Co., Milwaukee, Wis.

Treatment crude oil having tar and asphalt content, using concentrated sulfuric acid during process. No. 1,997,896. Walter S. Baylis, Los Angeles, Cal., to Fitrol Co. of Cal., Los Angeles, Cal.

Apparatus for and method of separating and washing materials. No. 1,997,915. Harold Robt. Rafton, Andover, Mass., to Rafton Engineering Corp., a corporation of Mass.

Manufacture zinc oxide coated with a fatty acid. No. 1,997,925. Alwin C. Eide, Columbus, Ohio, to American Zinc, Lead & Smelting Co., St. Louis, Mo.

Manufacture ammonium trinitrate; by mixture ammonia with nitric acid. No. 1,997,927. Stefan Julius Gelhaar. Ljungaverk, Sweden, to Stockholms Superfosfat Fabriks Aktiebolag, Stockholm, Sweden.

Manufacture abrasive wheel; preparing a moldable mixture of abrasive grains, calcined magnesite, argillaceous material, and magnesium chloride solution, then molding in desired shape. No. 1,997,957. Cecil E. Wilson, Covington, La., to Independent Grinding Wheel Co., Inc., a corporation of La.

Production a styrol from alkyl benzol; pyrogenically dehydrogenating alkyl benzol in presence of a dehydrogenating material containing sulfur, No. 1,997,967. Willis A. Gibbons, Great Neck, and Omar H. Smith, New York City, to U. S. Rubber Co., New York City.

Apparatus for coating bodies with a layer of hard carbon. No. 1,998,060. Georg Seibt, Berlin-Schoneberg, Germany.

Apparatus for manufacture nitric acid. No. 1,998,106. Nicolay Titlestad, Charlotte, N. C., to Chemical Construction Corp., Charlotte, N. C.

Physiologically balanced salt mixture, soluble in water and chemically stable. No. 1,998,179. Eduard Julius Wolf, Hamburg, Germany.

Method purifying di-sodium phosphate containing iron and aluminum impurities. No. 1,998,182. Francis M. Anable, Chicago Heights, and George Klein, Chicago, Ill., to Victor Chemical Works, Chicago, Ill.

Preparation catalyst and production acetic acid; reacting a gas containing CO with methanol in presence of a catalyst in which an oxide of tungsten is used. No. 1,998,218. Ralph Lyman Brown, Syracuse, N. Y., to Atmospheric Nitrogen Corp., New York City.

Preparation catalyst and production of an oxygenated organic compound from an aliphatic alcohol and a CO gas. No. 1,998,219. Ralph Lyman Brown, Syracuse, N. Y., to Atmospheric Nitrogen Corp., New York City.

Preparation a multi-component catalyst, active to catalyze the reaction of an aliphatic alcohol and CO in presence of hydrogen. No. 1,998,220. Ralph Lyman Brown, Syracuse, N. Y., to Atmospheric Nitrogen Corp., New York City.

Method and apparatus for supplying chlorine gas. No. 1,998,250. Gerald D. Peet, Montclair, N. J., to Wallace & Tiernan Co., Belleville, N. J.

Method causing a malonic ester to react with a material selected from the group of an alkylating agent and an aralkylating agent, an alkali metal alcoholate being added during course of reaction. No. 1,998,307. Thomas S. Carswell, Kirkwood, and Harry W. Faust, St. Louis, Mo., to Monsanto Chemical Co., St. Louis, Mo.

Preparation resinous product derived by the polymerization of trichlor ethylene. No. 1,998,309. Frank M. Clark and Walter M. Kutz, Pittsfield, Mass., to General Electric Co., New York City.

Improvement lubricating oils; having an addition thereto of polymerized styrene. No. 1,998,350. Carl Wulff and Wilhelm Breuers, Ludwigshafen-am-Rhine, and Friedrich Moll, Mannheim, Germany, to I. G., Frankfort-am-Main, Germany.

Process dewaxing wax-bearing mineral lubricating oil. No. 1,998,397. Bernard Y. McCarty, Beacon, N. Y., and Wm. E. Skelton, Cambridge, Mass., to Texas Co., New York City.

Manufacture low pour test lubricating oil from wax-bearing mineral oil; first mixing oil with a selective solvent liquid composed of ethylene dichloride and amyl alcohol. No. 1,998,398. Bernard Y. McCarty, Beacon, N. Y., and Wm. E. Skelton, Cambridge, Mass., to Texas Co., New York City.

Apparatus for and improved method of roasting green catalysts containing heat decomposable metallic nitrates. No. 1,998,401. David A. Shepard, Elizabeth, N. J., to Standard Oil Development Co., Bayways, N. J.

Production polymers of ketene; by contacting it with a metallic surface promoting polymerization of the ketene. No. 1,998,404. Peter J. Wiezevich and Anthony M. Gleason, Elizabeth, N. J., to Standard Oil Development Co., Bayways, N. J.

Manufacture metal alkyl sulfates from dialkyl sulfates. No. 1,998,411. Sylvan R. Merley, Palmyra, N. J., to Doherty Research Co., New York City.

Production low boiling point pure esters of aliphatic acids, containing at least one olefinic double bond from a mixture of such an ester. No. 1,998,413. Walter Reppe and Ulrich Hoffmann, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Manufacture zinc oxide from an agglomerated charge of mixed zinciferous material and carbonaceous reducing agent confined in an externally heated retort. No. 1,998,440. Earl H. Bunce, Clarence J. Lentz and Geo. T. Mahler, Palmerton, Pa., to New Jersey Zinc Co., New York City.

Process reacting tetrachloro-1,2,3,4-butane with an alkaline compound to remove hydrogen chloride from chlorobutane. No. 1,998,442. Wallace H. Carothers, Fairville, Pa., and Gerard J. Berchet, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Process for separating higher melting constituents from an oil-wax mixture which is adapted to be sweated. No. 1,998,464. Ivan M. Perkins, Brookline, and Stewart S. Kurtz, Jr., Merion, Pa., to Atlantic Refining Co., Phila., Pa.

Method obtaining a nickel catalyst free from sulfur; washing the nickel compound with a solution of an ammonium salt having an anion in common with the nickel compound. No. 1,998,470. Hugh S. Taylor, Princeton, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Process purifying concentrated caustic soda solutions. No. 1,998,471. Raymon E. Van der Cook, Inkster, and Earl Sweetland, Grosse Isle, Mich., to Penn Salt Mfg. Co., Phila., Pa.

Process for decomposing protein materials; pyrolytically distilling them while suspended in a mineral oil. No. 1,998,485. James R. Bailey, Austin, Tex., to Union Oil Co., of Cal., Los Angeles, Cal.

Preparation the benzyl ester of Bz'-halogen-benzoyl ortho-benzoic acid. No. 1,998,489 Frank A. Canon and Adolph Zimmerli, New Brunswick, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Manufacture 1-chloro-ethylbenzenes. No. 1,998,538. Hans Finkelstein and Willi Krey, Uerdingen, Germany, to I. G., Frankfort-am-Main, Germany.

Production iron oxide pigment; reducing an aromatic nitro compound in presence of a lead compound with metallic iron and an acid-reacting concentrated aqueous solution of a salt. No. 1,998,540. Ulrich Haberland, Uerdingen, Germany, to I. G., Frankfort-am-Main, Germany.

Production metallic oxide pigments, comprising ferric oxide, ferrous oxide, and an oxygen compound of phosphorus. No. 1,998,541. Ulrich Haberland, Uerdingen, Germany, to I. G. Frankfort-am-Main, Germany.

Preparation inorganic acid esters of the condensation products of glycol and chlorinated paraffin hydrocarbons. No. 1,998,583. Karl Keller, Frankfort-am-Main-Fechenheim; Heinrich Hopff and Jos. Nuesslein, Ludwigshafen-am-Rhine; and Eduard Gofferje, Frankfort-am-Main, Germany, to I. G. Frankfort-am-Main, Germany.

Preparation flaked sodium bisulfate composition; sodium bisulfate being embedded in a matrix of a solidified organic adhesive. No. 1,998,605. Ernest R. Boller, Willoughby, O., to Grasselli Chemical Co., Cleveland, O.

Process manufacturing hard cemented carbide material, containing a hard metal carbide and a metallic binding agent. No. 1,998,609. Gregory J. Comstock, Edgewood, Pa., to Firth-Sterling Steel Co., McKeesport, Pa.

Production catalysts containing molybdenum and tungsten. No. 1,998,626. Josef Koenig, Uerdingen-am-Rhine, Germany, to I. G. Frankfort-am-Main, Germany.

Process of and apparatus for transferring liquefied gases. No. 1,998,629. Henri Lagarde, La Varenne, France, to l'Air Liquide, Societe Anonyme pour l'Etude & l'Exploitation des Procedes Georges Claude, Paris, France.

Method separating wax from wax-bearing mineral oil, by addition to same of a synthetic product, using also a diluent. No. 1,998,648. John A. Anderson, Chicago, Ill., to Standard Oil Co., Chicago, Ill.

Process separating a beryllium compound from a mineral; mixing roasted mineral with water, saturating with CO_2, separating liquid, and neutralizing liquid with sodium bicarbonate. No. 1,998,685. Gino Panebianco and Carlo Adamoli, Milan, Italy.

Process casting clay articles; mixing clay, water, a deflocculant and a neutral alkali salt, then agitating and placing in molds. No. 1,998,686. Jos. R. Parsons, Chicago, Ill., to U. S. Gypsum Co., Chicago, Ill.

Recovery high melting point wax from a mineral oil stock; first step, mixing stock with a crystallization regulator and a liquefied normally gaseous hydrocarbon diluent. No. 1,998,747. Chester E. Adams, Hammond, Ind., to Standard Oil Co., Chicago, Ill.

Treatment deep wells; introducing into well an organic jellifying material and bacteria capable of converting into a liquid the jelly resulting from mixing the material and water. No. 1,998,756. John Grebe and Sylvia M. Stoesser, Midland, Mich., to Dow Chemical Co., Midland, Mich.

Manufacture starch treated hydrated mercerized paper pulp. No. 1,998,758. Harold S. Holt and Geo. L. Schwartz, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Method simultaneously separating heavy residual petroleum lubricating oil stock into lubricant distillate fractions while removing the naturally occurring acids therefrom. No. 1,998,765. Wm. B. Logan, White Plains, N. Y., to Texas Co., New York City.

Process heat treating crude China wood oil. No. 1,998,768. Wm. Nanfeldt, Clifton, N. J., to World Bestos Corp., Paterson, N. J.

Process for purification of liquids. No. 1,998,774. Claude A. Bulkeley, Buffalo, N. Y., to Chester F. Hockley, receiver of The Silica Gel Corp.

Process adapted to convert siccative oil into an emulsion for application on surfaces of cement, wood, or stucco. No. 1,998,845. Orlando da Cruz Sardinha, Rio de Janeiro, Brazil, S. A.

Process for desulfurizing mercaptan-bearing oil; contacting oil with an aqueous caustic wash, then treating with a gas containing free oxygen. No. 1,998,863. Lovell V. Chaney and Walter A. Schulze, Bartlesville, Okla., to Phillips Petroleum Co., Bartlesville, Okla.

Method cleaning balata and like gums; incorporating a solid detergent into the plastic gum, finally extracting resins from gum with organic solvents. No. 1,998,923. Fayette Dudley Chittenden, Nutley, N. J., to U. S. Rubber Co., New York City.

Manufacture linoleum; applying a finish coating on uncured plastic body of the linoleum; coating comprising glycerol phthalate, toluene, water and triethanolamine. No. 1,998,927. Earl B. Grosh and Samuel A. Cohen, Berkeley, and Val Fish, Oakland, Cal., to Paraffine Companies, Inc., San Francisco, Cal.

Manufacture acid-proof mortar; comprising sodium silicate solution, a filler, and one or more fluosilicates including barium fluosilicate. No. 1,998,935. Charles R. Kuzell, John R. Marston, and Francis X. Mooney, Clarkdale, Ariz., to United Verde Copper Co., Clarksdale, Ariz.

Leather, Tanning

Tanning skin substances; fusing an anhydrous bisulfate of sodium or potassium with titanium oxide, fusing resulting product with a bisulfite of sodium or potassium, and treating skin substance with resulting product in water. No. 1,997,658. Adolf Schubert, Milburn, N. J.

Tanning leather; treating hide with tanning solution containing chrome tan liquor and chrome oxide. No. 1,998,567. Frank Wayland, Salem, Mass.

Metals, Ores, Alloys, etc.

Process casing steel articles; using preparation of ammonia and hydrocarbon gas. No. 1,995,314. Adolph W. Machlet, Elizabeth, N. J.

Machine for concentrating ore. No. 1,995,433. George S. Nelson, Salt Lake City, Utah.

Production an alkali metal alloy. No. 1,995,440. Dorothy Hall Brophy, Schenectady, N. Y., to General Electric Co., Schenectady, N. Y.

Method of aerating slurries. No. 1,995,540. Arthur Hugo Harrison, Gold Pines, Ont., Canada, to Carbonated Lime Processes, Ltd.

Production magnetic sheet-like material for use in electrical apparatus; from alloy containing manganese, aluminum, and iron. No. 1,995,562. Vere B. Browne, Brackenridge, Pa., to Allegheny Steel Co., a corporation of Pennsylvania.

Method refining molten zinciferous lead with chlorine gas. No. 1,995,593. Paul Wefelscheid, Braubach, Germany, to American Lurgi Corp., New York City.

Method treating ores containing sulfides of copper and zinc; first treating an alkaline pulp of the ore with a cyanide. No. 1,995,817. Oliver C. Ralston, Clarkdale, Ariz., to United Verde Copper Co., Clarkdale, Ariz.

Method effecting concentration of minerals by froth-flotation; by adding to mineral pulp a small amount of the oxygenated organic compounds boiling above 130°C. No. 1,995,915. Chas. L. Burdick, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production heat-resistant alloy; using chromium, aluminum, and iron. No. 1,995,923. Samuel L. Hoyt, Shorewood, and Robt. S. Archer, Whitefish Bay, Wis., to A. O. Smith Corp., Milwaukee, Wis.

Production zirconium alloys. No. 1,996,037. Frederick M. Becket, New York City, to Electro Metallurgical Co., New York City.

Process operating a case-hardening molten bath of a cyanide. No. 1,996,269. Walter Beck, Frankfort-am-Main, and Klaus Bonath, Cronberg in Taunus, Germany, to Deutsche Gold & Silver Scheideanstalt, vormals Roessler, Frankfort-am-Main, Germany.

A sand mold for metal casting; comprising a mold and a surface coating therefor of a cement having a heat-plastic rubber isomer as a base. No. 1,996,283. Marvin W. Dundore, Beloit, Wis., to Beloit Iron Works, Beloit, Wis.

Preparation a soldering flux containing chlorinated diphenyl, fluxing salt, and an organic solvent. No. 1,996,360. Conrad C. Callis, Oakmont, Pa., to Aluminum Co. of America, Pittsburgh, Pa.

Application to a metal to be soldered of a flux containing chlorinated diphenyl and para-dichlor-benzene. No. 1,996,361. Conrad C. Callis and Ralph B. Derr, Oakmont, Pa., to Aluminum Co. of America, Pittsburgh, Pa.

Preparation a soldering flux, containing chlorinated diphenyl, chlorinated naphthalene, and para-dichlor-benzene. No. 1,996,362. Conrad C. Callis and Ralph B. Derr, Oakmont, Pa., to Aluminum Co. of America, Pittsburgh, Pa.

Method preventing intercrystalline oxidation of aluminum, magnesium and their alloys in heat treatment thereof. No. 1,996,379. Fred Keller, Jr., New Kensington, Pa., to Aluminum Co. of America, Pittsburgh, Pa.

Manufacture a metallic foil having a permanent lubricating coating of a compound of the formula $C_nH_{2n}O_2$, where n is greater than 10. No. 1,996,392. Thomas A. Torrence, Parnassus, and Frank L. Endean, Pine Manor, Pa., to Aluminum Co. of America, Pittsburgh, Pa.

Production base metal for vitreous enamel; steel having following composition sulfur, phosphorus, carbon, manganese, silicon, and iron. No. 1,996,568. Clarence H. Butts, Monroe, Mich., to Newton Steel Co., Monroe, Mich.

Manufacture an improved electrode; composed of carbon, graphite or graphitized carbon impregnated with rosin and a drying oil. No. 1,996,643. Lee De Pree, Midland, Mich., to Dow Chemical Co., Midland, Mich.

Manufacture an alloy, consisting of chromium, cobalt, tungsten, silicon, manganese, and titanium. No. 1,996,711. Enrique G. Touceda, Albany, N. Y., to Consolidated Car-Heating Co., Inc., Albany, N. Y.

Production an improved cutting steel; containing carbon, vanadium, chromium, molybdenum, and iron. No. 1,996,725. Arthur Howard Kingsbury, Skaneateles, N. Y., to Crucible Steel Co. of America, New York City.

Preparation corrosion inhibitor; using an acid in contact with metal, and adding to acid a derivative of thiourea, and an alkyl nitrosamine. No. 1,996,730. Chas. A. Thomas, Wayne, and Chas. G. Grosscup, Phila., Pa., to Sharples Solvents Corp., Phila., Pa.

Apparatus for and method of forming slugs for use in extrusion processes. No. 1,996,905. Walter T. Davis and John A. McGinnis, Wheeling, W. Va., to Wheeling Stamping Co., Wheeling, W. Va.

Improved process for chemical bronzing of articles made of iron and alloys of iron and carbon, by immersion in an oxidizing bath. No. 1,997,141. Berardo Guerini, Brescia, Italy.

Manufacture permanent magnet, composed of oxides of iron and cobalt. No. 1,997,193. Yogoro Kato, Ebara-Machi, Tokyo, and Takeshi Takei, Shinagawa-Machi, Tokyo, Japan, to Mitsubishi Denki Kabushiki-Kaisha, a corporation of Japan.

Ore flotation; subjecting oxidized ore containing oxides or carbonates of heavy metals to froth flotation operation in presence of a dithiophosphate. No. 1,997,280. Ludwig J. Christmann, Jersey City, and Stuart A. Falconer, Elizabeth, N. J., to American Cyanamid Co., New York City.

Preparation a high temperature lithium-silicon composition, free from decomposition even at temperatures of the order of 700°C., and under inert atmospheres. No. 1,997,340. Hans Osborg, Teaneck, N. J., to Maywood Chemical Works, Maywood, N. J.

Production an aluminum base alloy which may be cast in chill molds without forming shrinkage cracks; composed of aluminum, iron, antimony, and magnesium. No. 1,997,494. Wm. E. Mansfield, Garfield Heights, O.

Treatment molten metal; by subjecting to action of a flux containing dehydrated sal soda, dehydrated saltpeter, and fluorspar. No. 1,997,602. Richard Robinson, Dormont, Pa., to Frank S. Christy and Nanette Christy, Grafton, Pa., as trustees for Arrar Corp.

Process comprising dipping the surface of a continuously moving strip of embossed sheet material into an adhesive, depositing glass particles over the adhesive in the depressed portions of the design. No. 1,998,053. John D. McBurney and Edgar H. Nollau, Newburgh, N. Y., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production a metallic alloy having corrosion resistant properties and good ductility; containing lead and magnesium. No. 1,998,168. Roy E. Paine, Cleveland, O., to Magnesium Development Corp., a corporation of Delaware.

Production a magnesium-base alloy containing lead manganese, and magnesium. No. 1,998,169. Roy E. Paine, Cleveland, O., to Magnesium Development Co., a corporation of Delaware.

Production a magnesium-base alloy, containing lead, silicon, zinc, and magnesium. No. 1,998,170. Roy E. Paine, Cleveland, O., to Magnesium Development Corp., a corporation of Delaware.

Production a magnesium-base alloy, containing lead, zinc, aluminum, silicon, and magnesium. No. 1,998,171. Roy E. Paine, Cleveland, O., to Magnesium Development Corp., a corporation of Delaware.

Apparatus for projecting in a molten atomized state hard bodies fusible with difficulty. No. 1,998,217. Francois Philippe Charles Benoit, Paris, France.

Method reducing alkali and alkaline earth impurity content of aluminum; using a gaseous fluorinated aliphatic hydrocarbon compound in the molten charge. No. 1,998,467. Philip T. Stroup, New Kensington, Pa., to Aluminum Co. of America, Pittsburgh, Pa.

Manufacture a packing for moving parts or bearings; packing element or member being coated with a mixture of comminuted aluminum flakes and a lubricant. No. 1,998,890. Joseph M. Bandish, Chicago, Ill.

Packing for moving parts of bearings, being a tubular sheath or casing of knitted fabric and containing a plastic or moldable mass of packing material having a coating of rubber cement and comminuted aluminum flakes. No. 1,998,892. Tillman J. Braden, Kalamazoo, Mich., to Duralmetallic Corp., Kalamazoo, Mich.

Naval Stores

Method refining rosin; washing a solution of rosin in a hydrocarbon solvent with a hydroxyalkylamine. No. 1,995,600. Jos. N. Borglin, Wilmington, and Leavitt N. Bent, Holly Oak, Del., to Hercules Powder Co., Wilmington, Del.

Treatment long leaf yellow pine; first by bath of mineral spirits, paraffin, and linseed oil; then in bath of sodium silicate with an added alkaline constituent. No. 1,996,567. Samuel D. Butterworth, Detroit, Mich., one-half to Josephine M. Butterworth, Detroit, Mich., and one-half to C. P. Gable, Gable, S. C.

Recovery rosin from alkaline liquors containing resinates. No. 1,997,171. Edward M. French, Columbus, O.

Paper, Pulp

Production bast fibers for paper making and other purposes. No. 1,995,900. Geo. A. Richter, Berlin, N. H., to Brown Co., Berlin, N. H.

Process for waterproofing paper; treating same with an esterifying derivative of a higher fatty acid, and drying. No. 1,996,707. Alexander Nathansohn, Berlin-Wilmersdorf, Germany.

Manufacture paper filled with an alkaline filler; introducing filler into fibrous mix, and adding starch. No. 19,528. Reissue. Harold Robt. Rafton, Andover, Mass., to Raffold Process Corp., a corporation of Mass.

Production translucent paper; by impregnation with a solution of sucrose octoacetate. No. 1,996,858. Paul Ballinger Davidson, Pittsburgh, Pa.

Process sizing paper; using a homogenized rosin emulsion. No. 1,997,366. Rudolf Kern, Oschatz, Germany, to Chemische Fabrik R. Baumheier Aktiengesellschaft, Zschollau, near Oschatz, Germany.

Manufacture paper; selecting an absorbent paper and applying an aqueous solution of glue and formaldehyde, mixed in animal glue. No. 1,997,487. Herman Reed Harrigan, Chevy Chase, Md., and John Milton Krauss, Washington, D. C., to District of Columbia Paper Mfg. Co., Washington, D. C.

Manufacture paper; having as filler finely divided cereal grain hulls. No. 1,998,190. Herman J. Finder and David H. Greene, Joliet, Ill.

Manufacture paper; using mixture comprising caustic soda liquor, wood, borax, ammonium chloride, oxalic acid, potato starch, and sodium sulfate. No. 1,998,344. Robert Thomas, Lake, Miss.

Plastics

Preparation molding composition; comprising asbestos fibers, calcined magnesite, and colloidal clay of the character of Bentonite. No. 1,995,412. Clements Batcheller, Portsmouth, N. H.

Production a polymeric lactide resin. No. 1,995,970. Geo. Lowrance Dorough, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production benzine and oil soluble condensation products. No. 1,996,069. Herbert Honel, Vienna, Austria, to Beck, Koller & Co., Detroit, Mich.

Production a homogeneous artificial mass; by reacting an excess of a wax-like ester with a condensation product. No. 1,996,070. Herbert Honel, Vienna, Austria, to Beck, Koller & Co., Detroit, Mich.

Manufacture a molded article; commingling in the dry solid state a urea compound, a solid polymeric aldehyde, and a filler. No. 1,996,087. Otto Sussenguth, Erkner, near Berlin, Germany, to Bakelite Corp., New York City.

Production new Celluloid-like artificial compound of a polyvinyl alcohol aldehyde condensation product. No. 1,996,216. Fritz Schmidt, Troisdorf, near Cologne-am-Rhine, Germany.

Manufacture laminated stock suitable for electrical insulation; superimposed sheets of porous wood fibers having an alpha cellulose bonded with a resinoid. No. 1,996,314. Gordon E. Wightman, Upper Montclair, N. J.

Preparation a water-insoluble plastic; using olefin dihalides, a polysulfide solution, carbon disulfide, material containing the radical of an oleic acid, and a basic lead compound. No. 1,996,486. Joseph C. Patrick, Kansas City, Mo.; one-half to Nathan M. Muookin, Kansas City, Mo.

Manufacture plastic, elastic, flexible substances; causing reaction between alkaline polysulfides and furfural. No. 1,996,487. Jos. C. Patrick, Trenton, N. J.

Manufacture of a molded article from an absorptive filler and a heat-hardening resinous binder. No. 1,996,757. Ernst Elbel, Erkner, near Berlin, Germany, to Bakelite G. m. b. H., Berlin, Germany.

Apparatus for producing a thermoplastic covered metallic article. No. 1,996,951. James d'A. Clark and Herbert A. Kidd, Chillicothe, O., to Mead Research Engineering Co., Dayton, O.

Method of and apparatus for molding synthetic resinous articles. No. 1,997,074. Emil E. Novotny, Phila., Pa., to John Stogdell Stokes, Spring Valley Farms, Huntingdon Valley, Pa.

Process applying to a foundation-body a surface-sheet impregnated with a reactive synthetic resin varnish containing small amount of finely ground paper; product, in final step, having a continuous, non-crazing surface film. No. 1,997,358. John D. Cochrane, Jr., Cincinnati, O., to Formica Insulation Co., Cincinnati, O.

Production a laminated product having an enamel-like surface; applying to a foundation-body a surface-sheet coated with a dried varnish comprising a permanently thermoplastic resin and a pigment. No. 1,997,359. John D. Cochrane, Jr., Cincinnati, O., to Formica Insulation Co., Cincinnati, O.

Preparation plastic masses; a record having sound grooves, containing fibers of polymerized vinyl alcohol thoroughly incorporated with a polymerized vinyl acetate. No. 1,997,489. Willy O. Herrmann and Wolfram Haehnel, Munich, Germany, to Chemische Forschungsgesellschaft, m. b. H., Munich, Germany.

Production reactive resin compositions; reacting amyl alcohol and ethylene glycol monoethyl ether on a phenolic body with a compound containing an active methylene group. No. 1,997,614. Harold F. Wakefield, Newark, N. J., to Bakelite Corp., New York City.

Preparation a reaction product from a compound of a heat-hardening phenol-aldehyde resin and air-drying fatty oil, compound being reacted with a member of the group of carboxylic acid anhydrides and carboxylic acid chlorides. No. 1,998,098. Fritz Seebach, Erkner, near Berlin, Germany, to Bakelite G. m. b. H., Berlin, Germany.

Preparation a molded material, consisting of sericite, bearing metal dust, wax, resin, and cotton flock. No. 1,998,144. Chas. F. Noftzger, Chicago, Ill.

Production an artificial resin from a mass containing resit and a cellulose filling material. No. 1,998,211. Johannes van de Ven, Eindhoven, Netherlands, to N. V. Philips' Gloeilampenfabrieken, Eindhoven, Netherlands.

Production covering layers from carbamide-aldehyde condensation products. No. 1,998,539. Alphonse Gams and Willy Fisch, Basel, Switzerland, to Society of Chemical Industry in Basle, Basel, Switzerland.

Manufacture a plastic material capable of being hardened by water in the liquid or vapor form; using mixture of a hydraulic binder, a hygroscopic substance, and an anhydrous liquid organic compound. No. 1,998,667. Helmut Fritz, Mauer, and Emil Glaser, Vienna, Austria.

Manufacture a laminated sheet material; comprising a backing layer, mounted on which is a layer of non-woven fibrous material of a porous nature prior to treatment. No. 1,998,781. Ralph G. Jackson, Woodbury, N. J.

Manufacture a composite article; being two fibrous sheets, one impregnated with a phenol resin and the other with a mixture of a cellulose derivative and a phenol resin. No. 1,998,827. Willard P. Worrell, Riverside, and Francis E. Gruber, Berwyn, Ill., to Western Electric Co., New York City.

Method and apparatus for calendering plastic material. No. 1,998,866. Fred. D. Fowler, Newton, Mass., to Hood Rubber Co., Inc., Watertown, Mass.

Rubber

Production an adhesive unmasticated rubber solution. No. 1,995,319. Edward Arthur Murphy, Erdington, Birmingham, Frank Theodore Purkis, Moseley, and Douglas Frank Twiss, Wylde Green, England, to Dunlop Rubber Co., Ltd., Erdington, Birmingham, England.

Manufacture rubber bonded abrasive articles; mixing abrasive grains with a dispersion of previously coagulated rubber and a vulcanizing agent. No. 1,995,321. Chas. S. Nelson, Niagara Falls, and Donald B. Sharpe, Tonawanda, N. Y., to Carborundum Co., Niagara Falls, N. Y.

Preparation reversible rubber compositions from rubber latex and their reversal. No. 1,995,747. Royce J. Noble, Malden, Mass., to Heveatex Corp., Melrose, Mass.

Continuous method of producing rubberized fabric in submergence from liquid latex. No. 1,995,767. Wilbur J. Dean, No. Kansas City, Mo.

Preparation a latex composition containing a vulcanizing agent and a water soluble dithiocarbamate. No. 1,995,859. Wm. E. Messer, Cheshire, Conn., to U. S. Rubber Co., New York City.

Preparation rubber solvent; comprising a solution of rubber in a larger amount of a liquid organic sulfide. No. 1,996,001 Wm. Seaman, Brooklyn, N. Y., and Geo. L. Matheson, Elizabeth, N. J., to Standard Oil Development Co., Bayways, N. J.

Process breaking down crude rubber prior to addition of compounding and/or vulcanizing ingredients. No. 1,996,036. Wm. F. Tuley, Nutley, N. J., to U. S. Rubber Co., New York City.

Method and form for manufacturing rubber goods from an aqueous dispersion of rubber. No. 1,996,051. Douglas Frank Twiss, Wylde Green, England, to American Anode, Inc., Akron, O.

Coagulant composition; comprising a latex coagulant, a volatile organic solvent, and a less volatile substance. No. 1,996,090. Edward A. Willson, Akron, O., to American Anode, Inc., Akron, O.

Method vulcanizing caoutchouc; mixing caoutchouc, sulfur and a filler with a pentamethylene dithiocarbamate. No. 1,996,593. Erwin Schwenk, Berlin-Westend, and Hans Jordan, Glienicke, Germany, to Schering-Kahlbaum A.-G., Berlin, Germany.

Manufacture chlorinated rubber products. No. 1,996,937. Wilfred Devonshire Spencer, Wavertree, Liverpool, England, to Imperial Chemical Industries, Ltd., London, England.

Manufacture hard rubber products; vulcanizing rubber mixtures with sulfur, and adding selenium to accelerate vulcanization. No. 1,997,547. Laurence A. Edland, Glen Ridge, N. J., to R. T. Vanderbilt Co., New York City.

Method vulcanizing rubber; incorporating in a rubber mix an organic accelerator and an activator comprising a metal salt of propionic acid. No. 1,997,760. Ira Williams, Woodstown, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Method treating rubber to produce depolymerization; by subjection to action of caustic soda and a hypochlorite. No. 1,998,449. Richard Lloyd Davies, Denver, Colo., to Pennsylvania Salt Mfg. Co., Phila., Pa.

Process of retarding vulcanization of rubber; heating mixture of rubber, sulfur, and an accelerator in presence of 2,4-dinitrophenol. No. 1,998,559. Robert L. Sibley, Nitro, W. Va., to Rubber Service Laboratories, Akron, O.

Vulcanizing apparatus. No. 1,998,802. Roy W. Brown, Akron, O., to Firestone Tire & Rubber Co., Akron, O.

Textile

Method producing radio-active fibers; first step being saturation with soluble radio-active compounds and precipitating compounds with precipitants. No. 1,995,707. Franz Fattinger, Vienna, Austria.

Process for improving fibers of organic esters of undegraded cellulose insoluble in organic solvents. No. 1,995,804. Robert Haller, Riehen, near Basel, and Andreas Ruperti, Basel, Switzerland, to Society of Chemical Industry in Basle, Basel, Switzerland.

Production artificial silk in the form of spun cakes; weighting thread by water insoluble metallic compounds. No. 1,996,017. Franz Hoelkeskamp, Wuppertal-Wichlinghausen, Germany, to American Bemberg Corp., New York City.

Production artificial filaments, presenting reduced luster, from solutions of cellulose acetate in a volatile solvent comprising acetone and water. No. 1,996,120. Reginald Wm. Payne and Robert Pierce Roberts, Spondon, near Derby, England, to Celanese Corp. of America, a corporation of Delaware.

Process dyeing fibrous material with aniline black, and preventing the weakening of the fibers. No. 19,529. Reissue. Karl Schmidt, Munich, Germany.

Production artificial yarn; spinning solution of organic derivatives of cellulose in a mixture containing a volatile solvent and a non-volatile polyhydric alcohol. No. 1,996,753. Camille Dreyfus, New York City, and Wm. Whitehead, Cumberland, Md., to Celanese Corp. of America, a corporation of Delaware.

Production organic substitution derivatives of cellulose of improved color; by treatment with a dilute solution containing nitric acid. No. 1,996,754. Camille Dreyfus, New York City, and Leslie N. Lee, Cumberland, Md., to Celanese Corp. of America, a corporation of Delaware.

Manufacture artificial silk from organic cellulose derivatives. No. 1,997,753. Paul Schlack, Berlin-Karlshorst, Germany, to Aceta G. m. b. H., Lichtenberg, Germany.

Agent for sizing textile fibers; being mixture of two water-soluble polyvinyl compounds containing hydroxyl groups. No. 1,998,544. Kurt Jochum and Arthur Voss, Frankfort-am-Main, Hermann Geier, Mainz-Kastel, and Ewald Dickhauser, Gersthofen, near Augsburg, Germany, to I. G., Frankfort-am-Main, Germany.

Mercerizing process; treatment a textile material comprising cellulose hydrate with liquid ammonia. No. 1,998,551. Herbert Mahn, Dessau in Anhalt, Germany, to I. G., Frankfort-am-Main, Germany.

Production artificial silk having novel effects. No. 1,998,576. Georges Heberlein, Wattwil, Switzerland, to Heberlein Patent Corp., New York City.

Production novel character of artificial silk; first subjecting silk to action of a strong mineral acid. No. 1,998,577. Georges Heberlein, Wattwil, Switzerland, to Heberlein Patent Corp., New York City.

Production novel character artificial silk; subjecting same to action of nitration acid. No. 1,998,578. Georges Heberlein, Wattwil, Switzerland, to Heberlein Patent Corp., New York City.

Production novel character artificial silk; by subjecting same to a swelling agent. No. 1,998,579. Georges Heberlein, Wattwil, Switzerland, to Heberlein Patent Corp., New York City.

Water Treatment, Sewage, etc.

Water purification plant. No. 1,995,367. Spencer W. Stewart, White Plains, N. Y., to Ambursen Construction Co., Inc., New York City.

Process sterilizing water; by addition of an aqueous solution of elemental bromine. No. 1,995,639. Clark T. Henderson, Burlingame, Cal.

Method and apparatus for treating water. No. 1,995,914. John C. Baker and Gerald D. Peet, Montclair, N. J., to Wallace & Tiernan Co., Inc., Belleville, N. J.

Apparatus for producing soft boiler water. No. 1,996,136. Arthur C. Zimmerman, Dayton, O., to Duro Co., Dayton, O.

Application of chlorinated hydrocarbons in the treatment of sewage, garbage, drains, ditches, etc. No. 1,996,353. Herman Seydel, Jersey City, N. J.

Sewage sludge treatment; using chemical process. No. 1,997,252. Anthony J. Fischer, Jackson Heights, N. Y., to Dorr Co., Inc., New York City.

Treatment steam water boiler; by application of a chemical and an alkali-metal chromate. No. 1,997,256. Ralph E. Hall, Mt. Lebanon, Pa., to Hall Labs., Inc., Pittsburgh, Pa.

Method treating and purifying sewage. No. 1,997,302. Margaret M. Koller, Villa Park, and Maurice L. Miller, Chicago, Ill., one-third to H. A. Brassert & Co., Chicago, Ill.

The Literature

Articles of interest to the chemical and process industries particularly noted in a monthly review of the U. S. and foreign periodicals.

Chemical Production. "Potassium Sulfate from Polyhalite," by E. P. Schoch, University of Texas. *Industrial & Engineering Chemistry*, April, p467.

Chemical Specialties. "Sweeping Compounds." General review article. *Soap*, April, p91.

Color. "Tolerance in Color Specification," by M. Rea Paul, colorist, research laboratories, National Lead. Explains the G. E. recording color analyzer. *Oil, Paint and Chemical Review*, April 18, p16.

Corrosion. "Metallic Coatings as Protective Media." Some physical and chemical aspects examined. British, *Chemical Age*, March 23, p267.

Dyes. "Dyestuffs," by R. E Rose, E. I. du Pont de Nemours & Co. A general review. *Industrial & Engineering Chemistry*, April, p369.

Education. "The Chemical Engineer and His Training for Industry," by Dr. A. V. Underwood. British, *Chemistry and Industry*, March 15, p235.

Glass. "Glass Making in Britain 100 Years Ago," by H. W. Lee. British, *Glass Industry*, April, p116.

Historical. "Three Centuries of Chemical Industry In America," by Edward R. Weidlein and William A. Hamor. *Chemical & Metallurgical Engineering*, April, p185.

Hydrogenation. "The Hydrogenation of Bituminous Coal," abstract of a paper before the Technisch-Literarischen Gesellschaft, Berlin. British, *The Industrial Chemist*, April, p139.

Health. "The Absorption of Hydrocyanic Acid Vapour Through the Skin." Some experiments and conclusions. British, *The Industrial Chemist*, April, p135.

Laboratory. "The Measurement of pH Electrometrically." *Textile Colorist*, April, p227.

Rubber. "Rubber Latex as a Manufacturing Material." Describes rapidly growing applications. British, *Chemical Age*, April 20, p347.

Soap. "Liquid Soaps," their constitution and production described by Reginald Cartwright. British, *The Soap, Perfumery and Cosmetics Trade Review*, March, p13.

Raw Paint Materials. "The Mineral Earth Colors and Synthetic Iron Oxides," by J. W. Ayers, director of Research, C. K. Williams. *Paint, Oil and Chemical Review*, April 18, p11.

Plastics. "Sugar Plastics and its By-products," by F. M. Hesse. *British Plastics and Moulded Products Trader*, April, p503.

Plastics. "Practical Problems in the Manufacture of Resinoid Plastics, Part I." *British Plastics and Moulded Products Trader*, April, p499.

Textile Chemical Specialties. "Manufacturing Textile Compounds and Some of its Problems," by Prof. Albert H. Grimshaw, N. Carolina State College Textile School. *Rayon & Melliand Textile Monthly*, April p63.

Soap Raw Materials. "Olive Oil Foots," by Margaret J. Hausman. Discusses present unreliable methods of evaluation. *Soap*, April, p21.

Soap. "Reworking Coconut Soap Scrap," by Dr. G. Knigge. British, *The Soap, Perfumery and Cosmetics Trade Review*, March, p21.

Textiles. "Bleaching With Chlorine," by W. L. Savell, Mathieson Alkali. *American Dyestuff Reporter*, April 8, p131.

Textiles. "Rare Earth Metals in the Treatment of Textiles," by A. J. Hall. British, *The Chemical Age*, April 13, p327.

Timber. "The Chemical Aspect of Timber Research," by W. G. Campbell. British, *Chemistry and Industry*, April 5, p302.

Tire Fabric. "Progress in the Use of Rayon as a Tire Fabric," recent developments in experimentation bring the possibility of using rayon in tires a step nearer. *The Rubber Age*, April, p27.

Textiles. "Non-Inflammable Rayons." Methods of making rayon yarns and fabrics resistant to flame or fire. Special treatments for light and heavy weights. Temporary and permanent finishes. *The American Silk & Rayon Journal*, March, p37.

Textiles. "Dyeing and Finishing Plush and Velvet," by Sholto Egremont. *Rayon & Melliand Textile Monthly*, March, p65.

Varnish. "Varnish Manufacture," by W. T. Pearce. *Drugs, Oils & Paints*, March, p108.

Specialties. "Mechanic's Hand Soap," by W. E. Wilkinson. *Soap*, March, p21.

Raw Materials. "Refining The Salt of the Earth," by James A. Lee. A story on the salt industry. *Chemical & Metallurgical Engineering*, March, p124.

Miscellaneous. "Experiments on the Preservation of Wool Against Harmful Insects," by R. Burgess, Wool Industries Research Association. British, *The Journal of the Society of Dyers & Colourists*, March, p85.

Chemical Markets & News

Chemical Leaders See Favorable Aspects of NRA Retained — Opinions of the Industry's Prominent Executives — World Peace Foundation Challenges Statement That Industry Will Solve Problem of Agricultural Surpluses—U. S. Maintains Position as World's Largest Chemical Producer—

To say that the Supreme Court's adverse decision on NRA caused consternation in Administration circles would be to report the Washington situation in extremely mild terms. It certainly appears that no one in the inner circles of the Government from the President down expected such a complete rejection of New Deal policies at the hands of the Supreme Court. Uncertainty fills the air and even the usual suave, smiling, confident countenance of the President was changed at times to one of ill-concealed disappointment as he informed the press in a conference that lasted nearly 2 hours that the decision takes us back to the "horse and buggy" days of the late seventies, and that only a change in the Constitution will permit many of the "experiments" to be tried again without danger of rejection from the judicial division. Unfortunately for the New Dealers most of the recovery plans were made to rest on the wings of the Blue Eagle and with that bird's feathers completely plucked by the decision in a test case, which strangely, enough had to do with plucking feathers from the common chicken, the whole New Deal structure, according to all well-informed Washington writers is demoralized. As one Washington correspondent reported "More than one chicken had its head cut off by the Schechter decision. The whole scheme of government by alphabetical combinations is at an end."

Richberg Asks Cooperation

Donald R. Richberg, NRA chairman, issued the following statement shortly after the momentous decision was announced:

"Pending the determination of this question, I hope that all employers heretofore operating under approved codes and all their employees will cooperate in maintaining those standards of fair competition in commercial and labor relations which have been written into the codes with practically universal sanction, and which represent a united effort to eliminate dishonest, fraudulent trade practices and unfair competition in overworking and underpaying labor."

Many trade associations connected with divisions of the chemical industry issued statements, including ones by the National Fertilizer Association and the National Paint, Varnish, and Lacquer Association. Speaking for the latter, President Ernest T. Trigg in a letter to members of the industry, after quoting Mr. Richberg's announcement, stated:

"We feel confident that the members of this Industry will comply with the request made by the Chairman of the Board, and continue voluntarily to live up to the provisions of the Code of this Industry as they were in effect at the time of the Supreme Court decision. This includes observance of the minimum wage and maximum hour provisions, child labor prohibition, terms of sales and datings, performance guarantees, and all of the other conditions which are generally familiar to the members of this Industry.

"The fact that the National Industrial Recovery Act and the codes created under it are not now in effect places an added responsibility on all manufacturers and other employers. They have the opportunity now to demonstrate to the Administration and to the public generally that they can and will deal fairly with their employees as well as with their competitors and their customers without the force of law requiring it. Should a general breaking down occur insofar as hours and wages of employees and insofar as trade practices are concerned, it seems reasonable to prophesy that Industry itself will then have forced the enactment of legislation which might well be much more drastic and objectionable than that which has been so far proposed.

"We feel confident of the attitude of the members of this Industry in this critical situation. The example of forward looking action on the part of this Industry will tend to strengthen employers in other industries and be helpful to the whole situation."

du Pont Statement

Many of the larger chemical companies issued statements following the Supreme Court's NRA ruling. The duPont Co. stated officially: "The duPont Company contemplates no change in its employment policies or other policies as a result of the Supreme Court decision. It hopes and expects that its relations with employees will continue in the future on the same mutually satisfactory basis as in the past."

Bell Sees Gains Possible

William B. Bell, spokesman for the chemical manufacturing industry, and president of both the Chemical Alliance and the M. C. A., issued the following statement to the press:

"The code for the chemical manufacturing industry contained no provisions even remotely tending to price-fixing and no provisions whatever relating to unfair trade practices. In a survey taken shortly before the adoption of the chemical code not a single child under the age of 16 was reported to be employed. Most chemical wages exceeded the requirement in the code as approved by the President. The chemical industry has always had the reputation of maintaining fair wages and excellent working conditions, and I have no doubt that this reputation will be sustained.

COMING EVENTS

American Electroplaters' Society, annual meeting, Bridgeport, Conn., June 10-14.
National Fertilizer Convention, White Sulphur Springs, June 10-12.
American Leather Chemists' Association, Annual Convention, Skytop Lodge, Skytop, Pa., June 12-14
First Golf Outing, Salesmen's Association of the American Chemical Industry, June 18.
Twelfth Colloid Symposium, Cornell, June 20-22.
American Society for Testing Materials, annual meeting, Book-Cadillac, Detroit, June 24-28.
Penn. Sewage Wks. Association, State College, Pa., June 24-26.
Penn. Water Works, Operators Association, State College, Pa., June 26-28.
Del-Mar-Va Peninsular Fertilizer Association, Ocean City, Md., June 29.
International Agricultural-Chemical Congress, Brussels, Belgium, July 15-28.
A. C. S., 90th Meeting, San Francisco, week of Aug. 19.
Technical Association of the Pulp & Paper Industry, fall meeting, Atlantic City, week of Sept. 16.
Electrochemical Society, semi-annual meeting, Washington, D. C., Hotel Willard, Oct. 10-12.
Second Annual Convention, National Paint, Varnish and Lacquer Association, Mayflower Hotel, Washington, Oct. 30-Nov. 1.
In connection with the convention the "Paint Show" will be held Oct. 28-29 at Washington.
American Petroleum Institute, Biltmore Hotel, Los Angeles, Nov. 11-14.
Exposition of Chemical Industries, Grand Central Palace, N. Y. City, Dec. 2-7.
Sixth National Organic Chemistry Symposium, Rochester, N. Y., Dec. 30.
Chemical Engineering Congress, Central Hall, Westminster, England, June 23-27, 1936.

SOUTHERN ALKALI

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Alkali consumers located in the Southwest have learned from experience that they can depend upon the Corpus Christi plant of the Southern Alkali Corporation for prompt delivery of alkali products with definite standards of quality, uniformity and purity. Added to quality and dependability this plant offers alkali users:

QUICK DELIVERIES—*now a matter of hours rather than days.*
SHORT-HAUL LOW COST TRANSPORTATION—*tidewater or rail shipments.*
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A letter, wire or phone call to the office most convenient to you will bring full information regarding the various alkali products manufactured at Corpus Christi.

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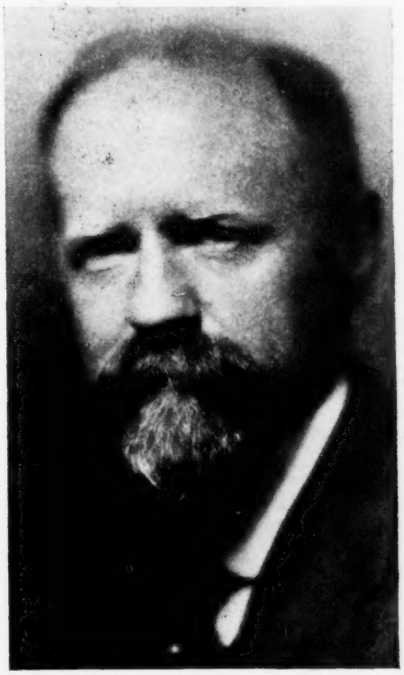
"The NRA was an experiment. It had become evident that it was retarding recovery. The Supreme Court has now held



INDUSTRY'S SPOKESMAN, BELL

The soundness of his long-held views is indicated by the recent momentous Supreme Court decision on NRA.

this experiment unconstitutional and thereby given an opportunity to business to proceed free of its limitations. What effect the decision has will be favorable as soon as business knows to what extent the difficulties and uncertainties confronting industry have been cleared away by the court. Needless to say, however, business cannot proceed with confidence until the government takes the necessary steps toward the prompt balancing of the budget, discards public spending as an instrument of recovery, and encourages the revival of private enterprise. In other words, until the government gives private industry a real opportunity to accept its responsibilities and to fulfill its function of employing the unemployed with full knowledge that the only risk it is taking is the risk inherent in business itself, unhampered by bureaucratic domination or government competition."

False Hope for the Farmer?

The World Peace Foundation has taken issue with those who hold out to the farmer the hope that industry will take up the slack in consumption of farm products (surplus crops) as a result of a survey conducted by it. The statement in part:

The Foundation in recent weeks has been conducting studies as to the relationship between world trade and peace and between world trade and American prosperity. Its survey of the present possibilities of agricultural products in industry was undertaken following the recent Dearborn chemical conference.

That Alcohol Mirage!

At the conference it was announced that a rich market for farm products existed through the manufacture of alcohol to be blended with gasoline for use as a motor fuel. To obtain the non-partisan viewpoint of leading chemical engineers the World Peace Foundation determined to obtain the opinions of the heads of chemical engineering departments in important universities and technical schools and of executives in the field of organic chemistry.

The questions asked by the Foundation included "Can you inform us what progress chemical research has made or promises to make in the near future toward devising new uses and markets for basic agricultural products? Will recent, current or pending chemical research result in early movement of a large volume of agricultural surpluses away from world trade channels?"

Two Technical Viewpoints

Dean Clement C. Williams, of the College of Engineering of the University of Iowa, stated: "There is no development in chemical research now available or in immediate prospect that will appreciably increase home markets for agricultural products. Researches made in the College of Engineering, University of Iowa, and regularly published, have shown that alcohol, either pure or blended with gasoline, is entirely uneconomical at present for fuel in internal combustion engines and that wide changes in prices would be necessary to alter this finding. Hence there is no reasonable hope for a large market for alcohol from grain or potatoes. Moreover, alcohol is now obtainable from forest by-products and petroleum refining competitively with vegetable and grain alcohol."

WHOA!

—Niagara Falls Gazette

Prof. Harry McCormack, head of the chemical engineering department of the Armour Institute of Technology, asserted that "chemical research offers no immediate processes for utilizing basic agricultural products normally sold in world markets in any new ways such as will withdraw them from the customary trade channels."

Foreign Trade

¶Commerce Dept.'s Survey Shows U. S. Leading Chemical Producer in '34 — Large Market Abroad for Chemical Equipment—Germany's Trade Analyzed—Wishnick-Tumpeer's New Foreign Associate—

The number of new chemicals produced commercially for the first time and the number of countries extending their activities into lines of chemical production new to them, probably exceeded all records in '34, according to a world survey of the chemical industry, just completed and made public by the Bureau of Foreign and Domestic Commerce, Dept. of Commerce.

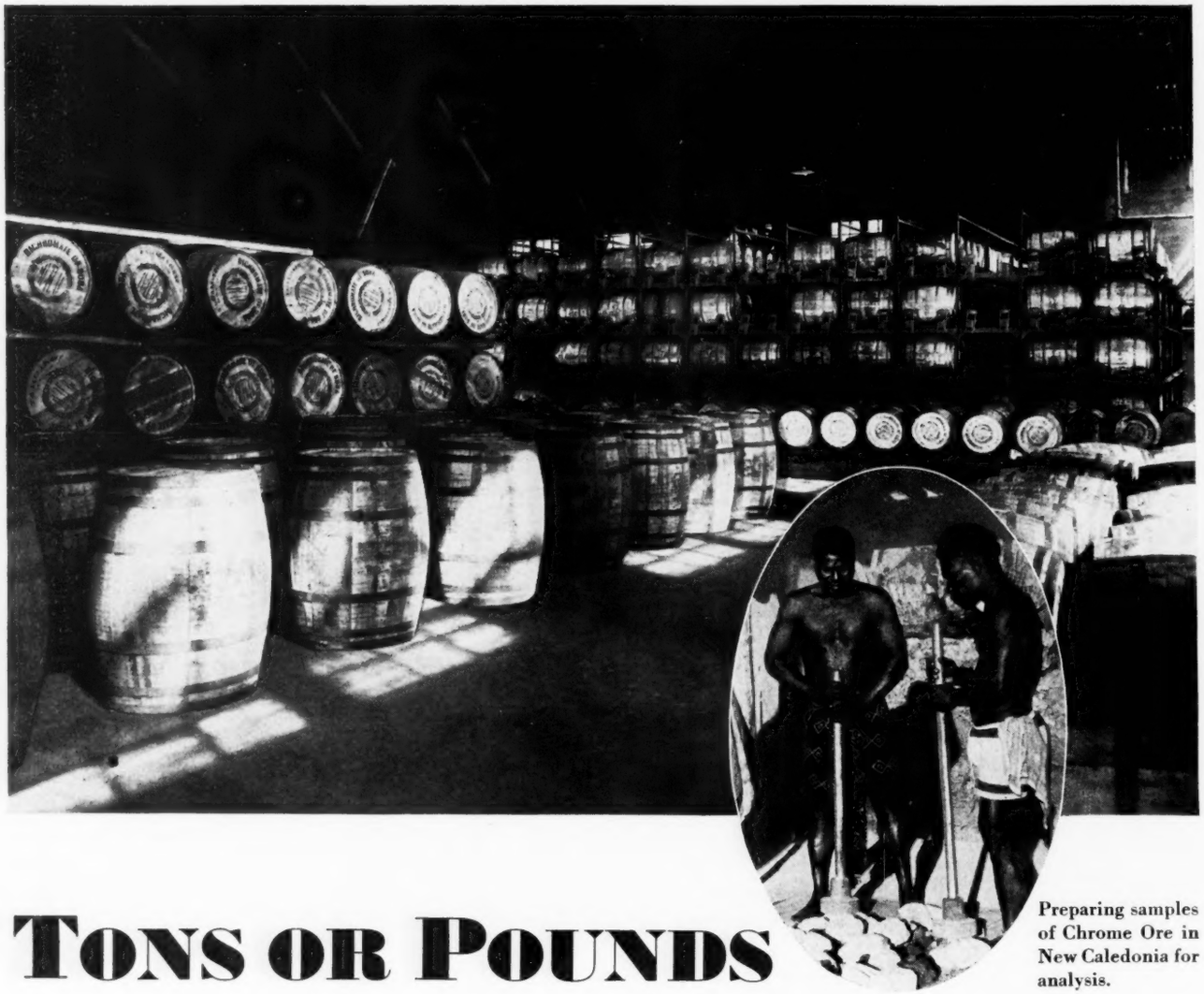
World chemical trade was larger in '34, than during the 2 preceding years, the survey reveals, but intense competition, the increased participation by Japan and Russia, and the maintenance of commercial barriers, retarded further progress.

Economic nationalism also continued an important factor in limiting international trade. Many European countries, for different reasons, were endeavoring to reduce imports, by utilizing domestic materials, many of which were being produced synthetically, particularly in Germany and in other European countries, it was stated. Published trade agreements affecting chemicals were less numerous in '34, but a number of private agreements were unofficially reported.

Germany Largest Exporter

The U. S. continued in '34 to be the world's leading chemical producer, a position it has held for a number of years. Germany continued the largest exporter of chemicals, the U. S. was second, with Great Britain following closely in third place. Great Britain, however, replaced the U. S. as the leading importer of such products, the study shows.

U. S. foreign trade in chemicals, both imports and exports, was maintained at comparatively high levels in '34, and held about the same relative position in world trade as in '33. Total chemical and allied products exports for the year were valued at $124,000,000, an increase of approximately 16% over the preceding year, with almost every major chemical group sharing in the monetary gain. Imports of chemicals and allied products, chiefly raw



Preparing samples of Chrome Ore in New Caledonia for analysis.

TONS OR POUNDS

From the careful sampling and analysis of the Chrome Ore at Mutual's mines in the South Sea Islands, through every step in the process to the finished products, the closest chemical control is exercised. The Ore reserves at both our mines and plants, together with the large stocks of finished material in our warehouses, provide a safe background against emergencies.

BICHROMATE OF SODA OXALIC ACID
BICHROMATE OF POTASH CHROMIC ACID

MUTUAL CHEMICAL CO. OF AMERICA

★ ★ 270 Madison Avenue, New York City ★ ★

FACTORIES AT BALTIMORE AND JERSEY CITY — MINES IN NEW CALEDONIA

Chemical Foreign Trade of Leading Countries—1934 and 1933

(Figures are all preliminary; reduced to equivalent in United States dollars from the several national units; differences from previous tabulations result from changes in official figures or in units of conversion.)

	Imports		Exports	
	1934	1933	1934	1933
Belgium	$46,000,000	$32,800,000	$58,300,000	$47,400,000
Canada	34,500,000	27,100,000	15,300,000	12,100,000
Czechoslovakia	17,700,000	14,300,000	9,900,000	7,300,000
France (estimated)	77,600,000	56,500,000	109,700,000	69,000,000
Germany	100,500,000	68,400,000	251,500,000	203,200,000
Italy	40,700,000	22,700,000	23,700,000	16,500,000
Japan	49,100,000	31,200,000	27,100,000	15,200,000
Netherlands	55,000,000	36,100,000	46,000,000	28,700,000
Spain	16,000,000	11,900,000	8,100,000	6,200,000
Switzerland	26,400,000	16,600,000	40,400,000	23,800,000
United Kingdom	106,700,000	72,500,000	118,200,000	92,900,000
United States	96,400,000	85,700,000	123,900,000	106,900,000

and exotic materials, increased 12% in value to $96,000,000 compared with '33.

The world chemical survey, which was conducted by C. C. Concannon, Chief of the Commerce Department's Chemical Division, covers developments in 47 countries, including the U. S., 26 of which are presented in considerable detail. Soviet Russia, Japan, and Latin American countries are stressed—the first 2 as competitors, the latter as markets. New commodities and new uses, cartels and marketing agreements are likewise discussed.

This survey "World Chemical Developments in 1934," Trade Information Bulletin No. 823, can be obtained from the Superintendent of Documents, Government Printing Office, Washington, or from any of the Department's District Offices located in the principal commercial centers of the country, at 10c per copy.

Chemical Equipment Markets

A world survey just completed and made available by the Bureau of Foreign and Domestic Commerce, Department of Commerce, indicates a growing market for machinery of the type suitable for use in plants manufacturing chemicals and allied products, including heavy chemicals, paints and paint products, pharmaceuticals, toilet requisites, plastics and the like, according to R. E. W. Harrison, Chief of the Commerce Department's Machinery Division. Almost every country in the world is busy establishing such factories, or modernizing and extending old plants and many of them have had to look to other countries for their machinery requirements.

The survey of "World Chemical Developments in 1934" shows that no less than 50 new chemical plants were established in Europe during '34, with practically every country participating. Many of these plants are either making products new to the country, or entirely new to the industrial world.

Austria established plants in '34 for the production of printing inks, lithopone, glycerin, pyroxylin plastics, synthetic resins, carbon dioxide, etc.; Belgium replaced an acetylene factory which was destroyed by fire in '31, and built new plants for the production of sulfates and chlorides; Czechoslovakia built plants for carbon black, printing inks, sulfites, etc.; Denmark established plants for dyestuffs, tanning materials and synthetic perfumes; and Esthonia reported a new turpentine distillery, the study shows. Although the erection of new factories in Germany and Italy were regulated by law, many permits were issued for the establishment of new chemical factories. Several chemical plants were reported from Great Britain, France and Hungary, and Russia was particularly active. Spain's activities were concentrated largely in the exploitation of potash and bismuth deposits, where plans include the establishment of several new concentration plants.

In Canada at least 13 new chemical factories were established or commenced during '34, most of which were designed for the production of industrial chemicals of various kinds. New plants established in Mexico included a lime oil factory, and one for the production of zinc oxide.

Only a few new chemical plants were reported from South America but it is believed more plants were constructed than present reports indicate. In the Near East and Africa pharmaceutical and sulfur plants were reported from Palestine; rose oil, acid, soda, and phosphate plants are planned in Turkey; Algeria reported match, acetate of lime and methanol plants; Morocco is to make paint and varnishes; and Rhodesia reported a sulfuric acid plant.

In the Far East Japan was particularly active in the establishment of chemical plants, according to the survey, and many old concerns were busy enlarging and modernizing existing plants. The number of plants completed in China during '34, or still under construction, is impressive. In Shanghai, a liquid ammonia and nitric acid plant is expected to be in operation in July, and a large alcohol plant started production in January of this year. Other alcohol plants are planned for Changsha and Canton, and oxygen and acetylene, caustic soda, and bleaching powder plants are scheduled for completion in other parts of China this year. Other chemical plants are scheduled for completion in British India, Netherland India, and other parts of the Far East in '35.

German '34 Chemical Trade

Weakness noted in Germany's chemical export trade during '34 has continued in '35 notwithstanding the aid of depreciated currency, barter trade, and other export promotion devices that have been resorted to. Germany's chemical exports during the first quarter of '35 decreased 9% in value to 160,421,000 reichsmarks compared with the same period last year, but the volume increased from 818,995 to 923,625 metric tons, thus reflecting the necessity of further price cutting to meet foreign competition.

Despite the 9% decline, however, chemicals continued, as in preceding years, to make a better showing than other commodity groups, accounting for 16½% of the total of all exports from the country compared with a little over 16% during the first quarter of last year and a little less than 13% during the first quarter of '32. In years prior to '32 percentage of chemical exports to the total of all exports was even lower.

Witco, Ltd., is a newly created associate of Wishnick-Tumpeer, with offices in Bush House, London. T. F. Dunn, Jr., is managing director. President Wishnick recently returned from an extended European visit. Witco will handle a complete chemical line besides specializing in carbon black.

Practically all chemical groups were affected by the export decline, many suffering heavy losses. Only important groups to show appreciable value gains were medicinals, photographic and other fine chemicals. Although prepared paints made export progress, such gains were more than offset by declines in export shipments of lacquers and pigments.

The most striking gain made by any individual product was recorded for calcium nitrate, a fertilizer material, exports of which reached the value of 4,032,000 reichsmarks, compared with only 866,000 reichsmarks for the first quarter of '34. This increase was due entirely, the report states, to heavier shipments to Egypt and Spain, as the

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Plant at BARBERTON, OHIO

U. S. took one-third less than in the first quarter of '34, or only 961 tons.

Exports of German chemicals to the U. S. showed marked variation during the first quarter of the year compared with the same period last year, some products showing volume increases, while others suffered heavy losses. Shipments of processed potash (sulfate chloride) to the U. S. increased 200%; cyanides almost doubled; synthetic guano increased 50%; and raw potash salts were up 20% compared with the first 3 months of '34. Other gains in shipments to the U. S. included potassium chlorate, ammonia and other alums, ammonium chloride, prepared and non-prepared medicines, photographic chemicals, and coal tar oils, statistics show.

Germany's Exports to U. S.

Exports of German chemicals to the U. S. which registered declines during the first quarter of '35 included caustic potash, 50%; potassium carbonate, 60%; sodium sulfate, 30%; potassium nitrate, 35%; and Epsom salts, 35%. Except in the alizarine group which declined 50%, shipments of dyes to the U. S. were maintained at '34 levels.

In contrast with the decline in value of German exports, exports of chemicals and allied products from the U. S. during the first quarter of '35 reached the total value of $30,850,000, an increase of 11% over the corresponding period of last year, and 44% more than for the first 3 months of '33. Almost all major classifications shared in the gain, particularly industrial chemicals, chemical specialties, high grade paint products, medicinals, toilet preparations, and industrial explosives.

Cuba As a Chemical Buyer

Cuba's trade in chemicals and chemical products has been good during the past year both as to importations and local production, according to a report from Assistant Trade Commissioner K. Molesworth, Habana, made public by the Commerce Department's Chemical Division.

A Consuming Market

Cuba, the report states, is primarily a consuming market and the bulk of its chemical trade consists of imports of materials for use in the sugar, fertilizer, soap, pharmaceutical, paper and paint industries. During the past year these industries have, with few exceptions, shown considerable improvement and the demand for chemicals has increased accordingly.

Principal potential chemical demand has been for fertilizers. In recent years the soap industry has been a very close second.

Since the beginning of '34, the report states, American manufacturers have been able, due to exchange, the reciprocity agreement, and other factors, to compete in many lines which heretofore have been dominated by European manufacturers.

A 2-Million Dollar Market

A special compilation, which does not include most items valued at less than $10,000, shows that U. S. exports of chemicals and allied products to Cuba during '34 increased 60% over the '32-'33 average, reaching a value of $1,791,000.

Foreign

¶International Agricultural Congress Meets in Brussels in July—Other Foreign Items—

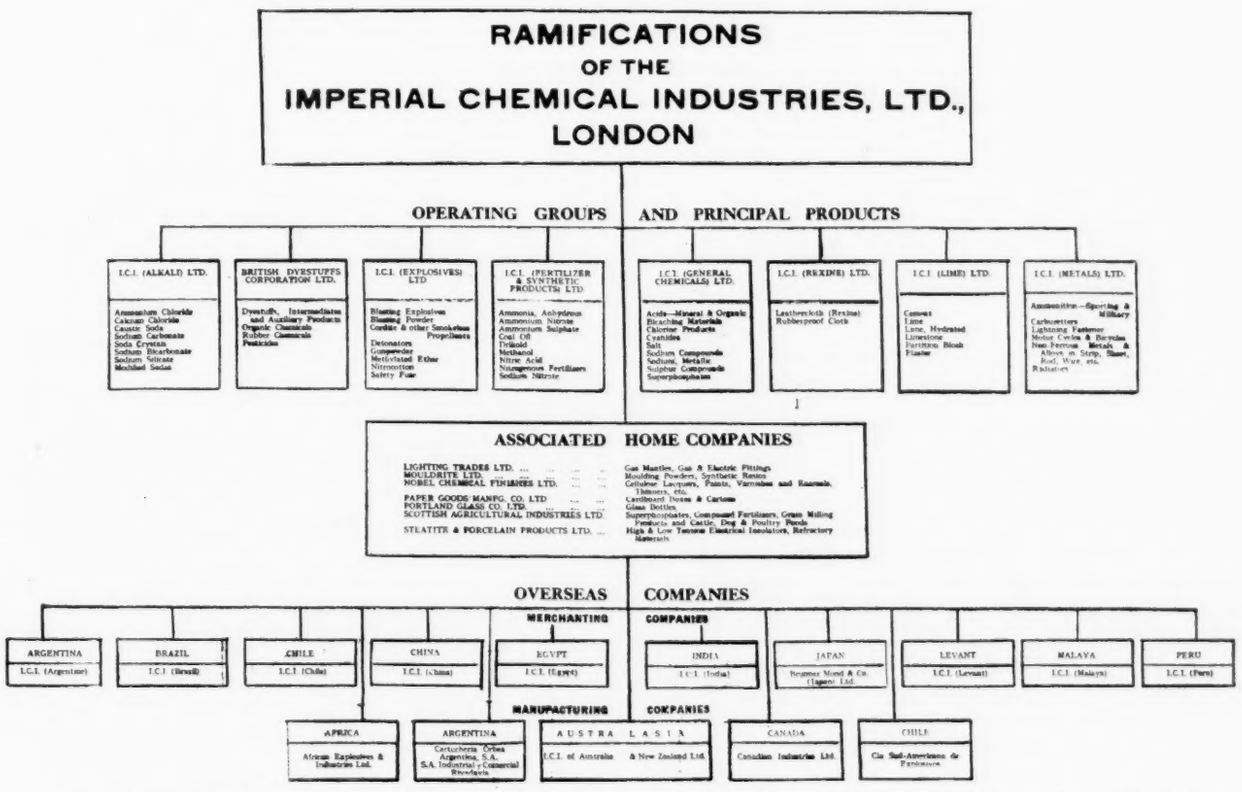
The International Congress of Agricultural Industries meeting in Brussels July 15 to the 27th will be organized in 4 divisions: 1) General scientific studies; 2) Agronomic studies; 3) Industrial studies, and 4) Economic studies. There will be some 26 sections comprised in these 4 general divisions. In order to assure that subjects of timely interest are discussed, special reporters upon 10 such topics will be appointed and the reports prepared by them printed and distributed in advance in order to assure fruitful discussion of these questions of "priority."

Russian potash developments reported in Orenburg, in the Kirghiz Republic, are said to be richer than the Solikamsk fields, but very inaccessible.

Synthetic sodium nitrate is to be made for the first time in Japan by the Showa Fertiliser Co.

According to the "Review of the Oils and Fat Markets," published by the English house of Faure, Blattman & Co., the '34-'35 whale oil catch, set at 2,500,000 bbls., is largely sold.

It is reported that British and foreign manufacturers of citric acid have reached a price agreement.



The Chemical Division of the Bureau of Foreign & Domestic Commerce graphically pictures the ramifications of England's great chemical organization, the I. C. I.

Allen Advises the "P. A.'s"

Chemical producers, jobbers and buyers are discussing with more than academic interest the suggestion of E. M. Allen, president of Mathieson Alkali, of contracts for '36 calling for monthly price adjustments as a protection against possible further inflation. Mr. Allen's suggestion was made before the National Association of Purchasing Agents at the organization's annual meeting held last month at the Waldorf in N. Y. City, Said Mr. Allen:

MATHIESON'S E. M. ALLEN

He threw a "bombshell" into the National Purchasing Agents' Association Meeting when he suggested monthly price adjustments in '36 contracts.

"I personally believe that when the 1936 contracts are negotiated, due to the business conditions that are ahead of us in this country, provisions should be embodied in same that will permit the buyer and seller to adjust their prices monthly.

"I also believe that one would be justified in increasing their inventories to a safe extent as the trend of prices of heavy chemicals is upward; that is, for the broad swing.

"I also believe that, if the administration would put recovery first and reforms second, would balance the budget, and would lend itself to establishing by international agreement, the relative values of the dollar, pound sterling, franc, lira, yen, and mark, and other units of money of the different important commercial countries of the world, as soon as the best interests of our country will permit, in one year our unemployment problem would be solved and in addition we would be so busy that all would be surprised at the results."*

* Mr. Allen's formal address is given on page 536 of this issue.

Personnel

¶Orlando Weber Startles Wall St. and the Chemical Industry with His Resignation—Atherton Now Board Chairman — Other Changes—

Orlando Weber, Allied's board chairman, resigned last month and while Wall Street built up quite a story connecting his resignation with the decision of the company to seek permanent registration on the N. Y. Stock Exchange under the rulings of the SEC, close friends of Mr. Weber assert that for the past 5 years he has been endeavoring to lighten the burden of his business interests so that he might devote more time to his hobby—economic research. Mr. Weber is generally pictured as being a somewhat mysterious character. Nothing could be further from the truth. While he has a very strong aversion to any publicity of a personal nature, he is always friendly and, to borrow a slang expression, "easy to meet."

H. F. Atherton, who succeeded Mr. Weber in the presidency, is now board chairman also. Those who follow Allied closely do not believe that Mr. Weber's retirement from active direction of the company will change the general rigid policies for which he was famous.

Others in New Fields

C. C. Gnuse is named secretary and treasurer of Monroe Chemical Co. of Quincy, Ill., E. M. Bonfoey, vice president and assistant treasurer.

Col. W. S. Battle, Jr., of Roanoke, Va., is elected to the board of directors of V.-C. Chemical succeeding J. P. Taylor of Richmond, who resigned because of ill health.

Dr. J. G. Hildebrand, Jr., joins the staff of Gustavus J. Esselen, Inc. Since receiving his Ph.D. from Columbia in '33, Dr. Hildebrand has been engaged in research and consultation in N. Y. City. Facilities of the Esselen organization are being extended to include a new laboratory devoted to the application of electronics to industry. Dr. Hildebrand will have charge of this work. He will also assist in the application of the principles of motion picture photography to the recording and interpretation of the results of scientific investigations. This will include work with the stroboscope as well as other recent aids to scientific photography.

Stanley C. Ellis joins the sales staff of Potash Co. of America, at Baltimore. Mr. Ellis was recently with Hydrocarbon Products, and also with Barrett in the ammonia sales division. He was at one time connected with American Potash & Chemical.

The appointment of Vernon H. Schnee to the staff of Battelle Memorial Institute is announced. Mr. Schnee was graduated in '19 from Cornell where he specialized in chemistry. He has had a wide commercial experience especially in the development and industrial application of inhibitors, lubricants, and non-ferrous alloys, and will be employed in this field of work at the Institute.

John M. Whitaker, well-known in chemical circles, is now with the Atlas Corp., investment trust, as an industrial engineer. His headquarters will be at 1 Exchange Place, Jersey City.

L. L. Stigler, formerly sales manager of Armour Fertilizer Works at New Orleans, La., joins Dandee Manufacturing Co. of Jackson, Miss., as sales manager and advertising director. Dandee Manufacturing Co. makes a wide variety of specialties.

Frank C. Vilbrandt, professor of chemical engineering at Iowa State College for the past 5 years, resigns to become head of the newly created chemical engineering department of Virginia Polytechnic Institute at Blacksburg, Va.

Henry Hotchkiss, Jr., is now supervising chemist for the Village of Larchmont and will have direct charge of water and sewage problems.

Carl A. Henlein, former Kentucky Color & Chemical research director, and more recently special representative for that company on the Pacific Coast, is now with Hilton-Davis Co., Cincinnati.

Equipment Co. Personnel

The election of Albert C. Bruce, president of the U. S. Hoffman Machinery Corp. to the board of directors of the Worthington Pump and Machinery is announced.

Lee Wright is appointed sales representative for Republic Steel, with headquarters at 401 Atlas Bldg., Salt Lake City, Utah.

Litigation

¶General Chemical Wins a Rehearing on Sulfuric Catalyst Patent Suit Against Standard Wholesale Phosphate & Acid — Nat. Carbon is Victor in Chaney Patent Suit—

The now famous sulfuric acid patent case between General Chemical and Standard Wholesale Phosphate & Acid reached a new stage on May 21 when the U. S. Circuit Court of Appeals ruled that the lower court was in error in deciding in favor of Standard on the ground of unreasonable delay in the filing of a disclaimer. The case was remanded for a rehearing.

General charged infringement (in the original suit) of reissue patent No. 19,282 (the well-known Slama, Wolf patent). Previously, General entered suit in July of '29 against Selden but lost the decision when in June '32 it was ruled that claim 7 was invalid in that it failed to enumerate one of the essential elements of the catalyst, and that the other claims were valid but were not infringed when restricted to the specific disclosures, as required by the state of the prior art. Later this decision was upheld on appeal. Selden's attempt to block the suit against its customer, Standard, failed however, but the decision of the lower court went against General because of failure to file within a reasonable time disclaimer as to claim 7. Now the question is again back before the court for trial.*

Chaney Patents Infringed

In a decision rendered by U. S. District Court for the District of Connecticut May 13, the Chaney patents Nos. 1,497,543 and 1,497,544, covering activated vapor adsorbent carbon, were held valid and infringed. Suit was brought by National Carbon, unit of Union Carbide, against Richards & Co., Inc., and The Zapon Co., because the 2 latter companies were using for solvent recovery activated coconut carbon which had been made by Barnebey-Cheney Engineering Co. Columbus.

U. S. District Judge Hincks held that this constituted infringement of the plaintiff's patents, claims of which he found valid. He rendered judgment in favor of the plaintiff for $24,410.65.

Personal

¶Kraus Receives Gibbs Medal—Merck on N. J. Advisory Banking Board—Whitaker Addresses the National Conference Board—

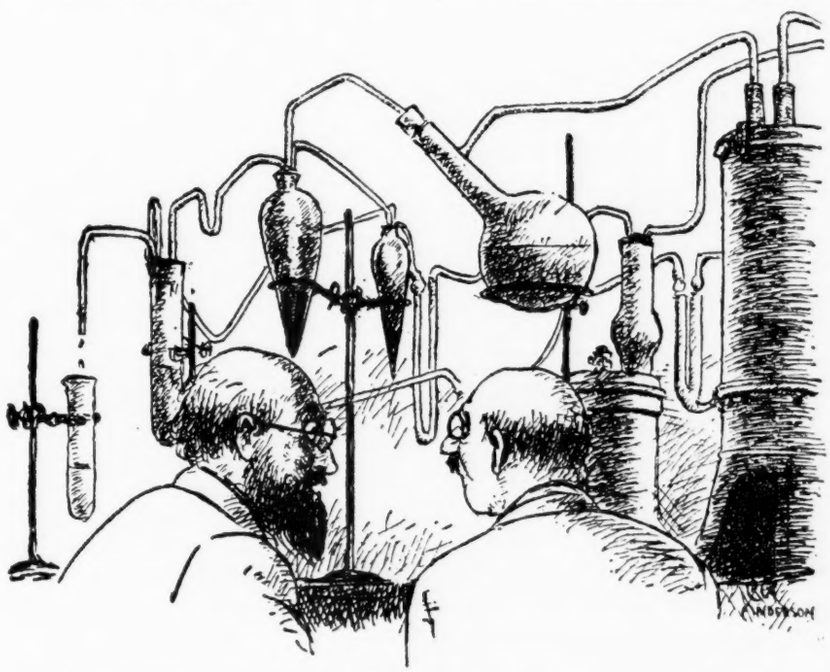
America will be crippled unless its industries inaugurate research programs which will develop the high chemical talent evident among students throughout the country, Dr. Charles A. Kraus, professor of chemistry and director of the Newport Rogers Laboratory, declared in accepting the Willard Gibbs Medal of the Chicago Section of the A. C. S. in a ceremony at the Stevens Hotel.

Prof. Roger Adams of the University of Illinois, president of the Society, presented the medal, one of the highest scientific honors bestowed in the U. S., to Dr. Kraus, the 24th medalist, citing his "valuable contributions to the knowledge of reactions in liquid ammonia, enlargement of the understanding of the chemical behavior and characteristics of metals, and extensive development of the field of the elements germanium and gallium."

George W. Merck is nominated by Governor Hoffman of New Jersey for membership on the State Banking Advisory Board.

Dr. M. C. Whitaker, Cyanamid vice-president, was the principal speaker before the National Conference Board at its general meeting last month. His subject was research and how it is holding down output costs.

Dr. Charles L. Reese, president of the Wilmington Society of Fine Arts, presided at the recent dinner of the group.



"I should get $H^2SH^3CLO^4$ but it comes out gin!"

—N. Y. American

"The Gangplank"

¶Bowker in Europe for An Extended Stay—Dr. Tattersfield Arrives to Speak at Insecticide Convention in Chicago—Rosendahl, Glyco, Sails—

Horace Bowker, chairman of the board of AAC, accompanied by Mrs. Bowker, sailed for Europe on May 4 for an extended trip of several months. Mr. Bowker has not been in the best of health for some time.

Dr. F. Tattersfield, D.Sc., F.I.C., head of the department of insecticides and fungicides of the British Rothamstead Experimental Station, who is here to address the convention of the National Association of Insecticide and Disinfectant Manufacturers, in Chicago, is the guest of S. B. Penick.

J. C. Nash, president of Columbia Naval Stores, Savannah, accompanied by Mrs. Nash, sailed in the *Empress of Britain* May 21. During an absence of about 2 months Mr. Nash will visit the chief naval stores markets of the United Kingdom and Continental Europe.

Edward Rosendahl, vice-president and general manager of Glyco Products, 949 Broadway, N. Y. City, is leaving for a business trip to Europe in the *Berengaria* on June 19. Mr. Rosendahl will visit the Glyco Products Continental European representatives, Generale Industrielle in Paris and the Company's British representatives Rex Campbell & Co., in London, with a view of obtaining first hand information on the European market.

Charles Hermann, vice president of McKesson & Robbins, is back, following an extensive business trip abroad.

Visitors to the U. S. last month included I. E. Wever, technical director of B. Laporte, Ltd., London. His company recently started production of hydrogen peroxide. While in this country Dr. Wever is making his headquarters at the offices of Henry Sundheimer, Inc., 103 Park ave., N. Y. City.

15th Chemical Exposition

The 15th Exposition of Chemical Industries which occurs this year will be a truly great industrial event to judge by the factors and forces which are increasing in momentum at this time when the show is still 6 months away. Exposition will be held during the week of Dec. 2-7, at Grand Central Palace, N. Y. City. In addition to its display of raw materials and finished products the event this year promises to be a great exposition of equipment in terms of heavy plant ma-

* See C. I. Nov., '34, p. 437; Oct., '33, p. 339; also Chem. Markets, July, '32, p. 53.

MASTER CRAFTSMEN of Chemistry

FREDERICK ECHTERLING
Superintendent
Bismuth Production

Mr. Echterling's employment in the MALLINCKRODT CHEMICAL WORKS dates from March 22, 1898.

For over thirty years, his every working day has been devoted exclusively to the manufacture of Bismuth Salts.

"THE SCHOOL OF EXPERIENCE TRAINS MEN TO BE MASTERS."

Number 1 of a series of advertisements portraying the men and the methods responsible for the excellence of the products manufactured by

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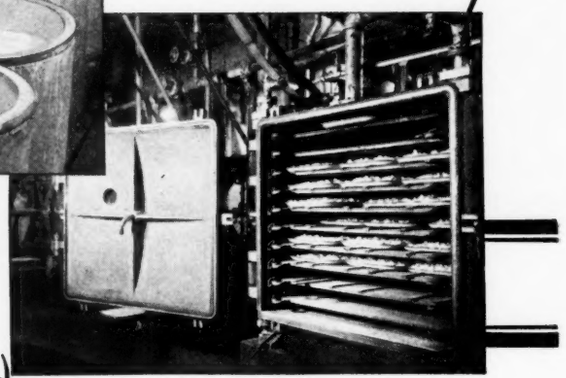

Bismuth (Mallinckrodt)

BECAUSE their propensity for adherence to mucous membrane and ulcerated surfaces is one of the important properties upon which the physiological action of the bismuth salts depends, physical characteristics, next to definite chemical structures, is the most important quality consideration. In order to insure bismuth products uniformly definite in chemical composition, high in bulk, fine in particle size, true to laboratory standard in color, and stable in imperviousness to the effect of light, it is necessary to employ processes of such a degree of flexibility as to the details of manipulation that no method has yet been found equal to skilled hand operation.

Hand work is admittedly more costly than machine work. But experience has dictated the better method. Machines of every kind that gave promise of improvement in process or product have been tried in the Mallinckrodt plant, only to be discarded for human hands and human brains.

Practically every step in the manufacture of the bismuth derivatives is, in the Mallinckrodt plant, performed by what may be termed "hand processes," in that the work is done almost entirely by workmen, each of whom has been thoroughly trained in his particular operation — Master Craftsmen of Chemistry.

Because of the Mallinckrodt manufacturing processes, perfected through the years, and of uncompromising standards, safeguarded by rigid laboratory control, every package of a chemical bearing the Mallinckrodt label is as fine a product as scientific research, skill, and experience can produce.

MALLINCKRODT BISMUTH SALTS IN PHARMACEUTICAL PRODUCTS

The Mallinckrodt bismuth salts will be found to result in smoother ointments and triturates, finer powders, and in mixtures give more even suspension because of their uniform bulk, freedom from acids, and smooth soft texture. These properties assure

COSMETICS OF THE HIGHEST UNIFORM QUALITIES

BISMUTH SUBCARBONATE (Mallinckrodt)

While the U.S.P. allows a product of varying chemical composition, the Mallinckrodt product is definite in chemical structure, being true Bismuth Subcarbonate, $(BiO_2)\ CO_3$, assaying 91% basic oxide, and 8¼% combined carbon dioxide as compared to the permissible 6 to 7%. Bulks about 32 fl. oz. to the pound and passes 200 mesh or finer. Will not discolor on exposure to sunlight. All other Mallinckrodt bismuth salts are of equal high standard in both chemical structure and physical properties.

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CHEMICAL WORKS

NEW YORK
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MAKERS OF OVER 1500 FINE CHEMICALS

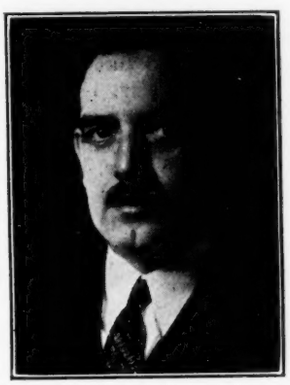
chinery and the innumerable accessory machine units which serve the great industrial plants and represent the handling of mass production operations after they have been worked out in the laboratory and semi-work's production scale.

An additional factor of appropriate timing is seen in the fact that the Exposition, by virtue of the week during which it is presented, will be available to the great influx of members of the mechanical engineering fields who will be in New York attending the national midwinter meeting of the American Society of Mechanical Engineers. The matter of design, purchase, and operation of industrial plant equipment—the functions of chemical engineering and mechanical engineering—are increasingly related.

Associations

¶*Chemical Engineers Discover Wilmington Hospitality and Industrial Importance — American Institute of Chemists Meets at Atlantic City—Many Golf Tournaments Scheduled—*

The delightful and instructive combination of Wilmington hospitality and outstanding position as a chemical manufacturing center of first importance proved most acceptable to over 500 members of the A. I. Ch. E. led by President A. E. Marshall, well-known N. Y. City consultant, who journeyed there in the 3rd week of the month.



PRESIDENT A. E. MARSHALL

A new attendance record is set as Marshall calls the A. I. Ch. E. meeting to order.

The American Institute of Chemical Engineers, in convention in Wilmington last month, set an all-time record of attendance of 505, equivalent to 36% of its total membership which is spread throughout most of the States of the Union and through 18 foreign countries. This registration has only been approached once since the Institute was founded 28 years ago; namely, at N. Y. City last year where there were 476.

The visitors were welcomed by Dr. Charles L. Reese, Sr., of the duPont Co. and formerly a president of the Institute of which he was one of the founders.

While in convention members of the Institute had the opportunity of inspecting the dye works of the duPont Co., Deepwater, N. J., and plants of the Bancroft Co. and the Haveg Corp.

In the van of Institute's members came, a day or so earlier, its officers and leaders—Albert E. Marshall, its president; Harry A. Curtis of Nashville, Tenn., its vice president, chief chemical engineer of the T. V. A.; Frederic J. LeMaistre of Philadelphia, secretary, a consulting engineer well known in explosive and nitrocellulose circles; Martin H. Ittner, of Jersey City, N. J., treasurer, chief chemist of Colgate-Palmolive-Peet; and John V. N. Dorr of N. Y. City, its past president, and president of the Dorr Co.

The general committee of Wilmington chemical engineers in charge of arrangements consisted of Dr. Charles L. Reese, honorary chairman, Fred C. Zeisberg, chairman, J. L. Bennett, vice chairman, and J. T. Power, secretary-treasurer. F. C. Mitchell was in charge of registration, C. H. Greenwalt, entertainment, J. C. Lawrence, plant visits, and J. H. Sachs, transportation. Albert G. Peterkin of Philadelphia was chairman of the committee on technical papers, while Anthony Anable of N. Y. City was chairman of the committee on public relations and was assisted by Chaplin Tyler of Wilmington.

Arrangements for the entertainment of the ladies attending were in charge of a committee of Wilmingtonians of which Mrs. Charles L. Reese was honorary chairman, Mrs. E. W. Maynard, chairman, and Mrs. F. C. Zeisberg, vice chairman. Mrs. J. L. Bennett was in charge of transportation, Mrs. H. W. Elley, information, and Mrs. C. H. Cordie, golf.

A Memorable Evening at "Longwood"

On Monday evening members and their wives were guests of Mr. and Mrs. Pierre duPont at a dinner served in the Conservatory of the duPont estate, Longwood, and later viewed the display of Mr. duPont's celebrated, illuminated fountains. On Tuesday afternoon the ladies visited many of the famous Wilmington gardens and had tea later at the estate of Dr. and Mrs. Charles L. Reese. In the evening the Institute dinner was held at the Hotel duPont.

The meeting was outstanding for the character of the papers presented. Several are digested for C. I. readers in the Plant Operation and Control and the Packaging, Handling and Shipping Sections of this issue.

A. I. C. Likes Atlantic City

The American Institute of Chemists held its annual convention at the Claridge at Atlantic City over the week-end of May 18-19 with Calco Chemical's chief chemist, Dr. Crossley, in the chair. The move to Atlantic City proved popular. The afternoon business session and the dinner in the evening were crowded. Many of the delegates and members brought their

PRESIDENT M. L. CROSSLEY

Leads "round-table" discussion on the unemployment problems of chemists.

wives and a number of ladies attended the dinner and remained for the round-table conference discussion on possible suggestions to be made to the Federal Government on how part of the five billion dollar relief plan could be profitably employed in giving chemists work that would at once prove non-competitive but useful to industry generally. Sunday was given over exclusively to enjoyment.

At the business meeting reports were read by delegates from the N. Y., Philadelphia, Niagara Falls, and Washington chapters. The Institute is now recognizing the outstanding graduating student in the chemical course in all the leading universities and colleges with a gold medal. A council meeting was held at luncheon on Saturday.

A. C. S. Releases

Appointment of a committee to give continuing consideration to matters affecting the status of the chemical profession, including unemployment of recent graduates, is announced by Dr. Charles L. Parsons, A. C. S. secretary, following action by the Society's Council.

Prof. Frank C. Whitmore of Penn. State heads the committee, composed of Forrest A. Anderson, Frank G. Breyer, and Harry A. Curtis. Committee will report at the next meeting of the Society to be held in San Francisco during the week of Aug. 19.

Walter A. Schmidt of Los Angeles, Calif., president of the Western Precipitation Company, has been elected a director of the Society to fill the unexpired term of president-elect Edward Bartow of Iowa State.

B. L. Clarke of the Bell Telephone Laboratories, N. Y. City, and Thomas R. Cunningham of Union Carbide and Carbon Research Laboratories, have been

chosen associate editors for the Analytical Edition of *Industrial and Engineering Chemistry*.

The Paint and Varnish Division of the Society has elected officers as follows: chairman, Everett W. Boughton of N. Y.; chairman-elect, Roy H. Kienle of Schenectady; secretary and treasurer, G. G. Sward of Washington, D. C.; executive committee, C. F. Rassweiler, H. E. Hancock and C. D. Holley.

They Take Up Golf

Philadelphia Chemical Club's first golf tournament in the history of that long established organization brought out 55 members and guests. The winners: "Sulfuric Acid": Low gross, R. S. Roeller, of Penn Salt Co.

"Nitric Acid": Low gross, William Clarey, of Barrett; low net, George B. Heckel, Jr., of *Drugs, Oils and Paints*.

"Hydrochloric Acid": Low gross, T. D. Hildebrandt, of J. T. Baker Chemical; low net, Thomas Gill, of Sloan Blabon, Trenton.

Association Briefs

Officers of the N. Y. section of the A. A. T. C. & C. are reelected at the May meeting. Chairman is Ephraim Freedman, of R. H. Macy & Co.; vice-chairman, George L. Baxter, of Bradford Dyeing Association; secretary, Patrick J. Kennedy, of duPont, and treasurer, John J. Sokolinski, of Arabol Manufacturing.

Thomas A. Wright of Lucius Pitkin, Inc., addressed the N. Y. Section of The American Association of Cereal Chemists on "The Role of the Spectrograph in Detecting and Determining Metals in Foods" on May 7th at the McGraw Hill Bldg.

Philadelphia Drug Exchange will golf Apr. 12 at St. Davids Country Club and reservations are in the hands of R. G. Anderson, 916 Parrish st.

Chicago Oil Men's Club will golf at Medinah Country Club on June 20.

Salesmen's Tournaments

The Salesmen's Association of the American Chemical Industry will hold the usual 4 golf tournaments during the summer period, one each in June, July, August, and September. First is scheduled for June 18 at the swanky and exclusive Baltusrol Golf Club at Short Hills, N. J. Other clubs scheduled are: North Hills, on Long Island, Wingfoot in Westchester, and Pomononk at Flushing, L. I.

A number of new members have been admitted including Peter J. Reilly, Jr., of Reilly Tar & Chemical; Leon Miller, a Barrett sales manager; Edward J. Schuellein; Henry Herman, General Dyestuff; Philip A. Hunt, president of the company bearing his name; and N. Newall Wyatt, of Warner Chemical.

Construction

¶Chemical Companies Continue to Expand Manufacturing Facilities—

Koppers Construction receives an order from Ford for the construction of a $4,000,000 by-products coke plant at Dearborn. This is the largest order given in the coke oven field in 7 years. Half of the contract will be for the building of 2 batteries of 61 Becker type ovens each, the rest of the amount to be used in other work for the ovens.

Pittsburgh Plate Glass has added to its plant construction and modernization program work which will call for the expenditure of $500,000. Together with previous building expenditures authorized this year, the total appropriation for plant improvement totals $5,080,000.

Charles Lennig & Co., awards contracts for construction of a 2-story and basement brick and steel research chemical factory and laboratory at Richmond and Kennedy streets, to cost $75,000 or more with machinery and equipment installations.

Work of clearing the ruins of the Penn-Charcoal chemical plant, at East Smethport, which was destroyed by fire several weeks ago, is completed. Plans for constructing a modern new building have not as yet been finished but as soon as these negotiations are closed it is expected that work of erecting the new structure will begin immediately.

Excellent progress is being made in the construction of the first unit of the Powhatan Converting Works, Inc., plant, two miles southeast of Martinsville, Va., on the Norfolk and Western railroad and Smith's River.

Sulphur Refineries, Inc., is organized as a California corporation, with offices in Los Angeles, to work the Crater sulfur claims in Inyo county, Calif. Organizers and officers are:—President, Gerald E. Ward, of Fontana, Calif.; vice-president, Arthur J. Crowley, of Los Angeles, and secretary-treasurer, C. E. Spencer, of Beverly Hills.

Approximately $500,000 will be spent by Liquid Carbonic for the expansion of its plant in Chicago, Ill.

Companies

¶United Carbon Forms New Production Subsidiary — New Research Organization — Other Notes*—

United Carbon Co., Charleston, W. Va., forms a new subsidiary under the name of United Carbon, Inc., for the purpose of facilitating management and operation of the company's carbon black plants in Louisiana, Texas, Oklahoma, Utah and Montana. Plants were formerly under the individual management of subsidiary and affiliated companies, according to Oscar Nelson, president.

* *The important announcement of the new company formed by Dow and Cleveland-Cliffs will be found on p. 585.*

Research On Metals

American Machine & Foundry Co., principal manufacturer in the U. S. of cigar and cigarette making machinery, enters the chemical field through a subsidiary, Intermetal Corp., formed some time ago to conduct research in metallurgy and allied lines.

Intermetal Corp. holds a patent for a chlorination method of refining refractory ores. This patent claims a method of separation of metals from ore by a chlorination process which subjects ores to treatment at varying temperatures adjusted to the metal to be recovered. Under this method, using sulfur higher chloride and chlorine together, different metals can be extracted from the ore by raising the temperatures used during the process to the varying points for different metals.

Company will also conduct research into development of inorganic catalysts, the field for which is growing.

Now Mac-Lac Co.

Mac-Lac-Kasebier-Chatfield Corp., shellac factor, is now known as the Mac-Lac Co.

With the Equipment Suppliers

Brown Instrument, Philadelphia, manufacturers of instruments and controls, and Minneapolis-Honeywell Regulator, Minneapolis, manufacturers of control systems and regulators, have opened a joint office at Atlanta, to serve the Southeast.

Mr. Wesley R. Moore, for a number of years district manager of Brown Instrument, is manager in charge, with Leon L. Kuempel, sales engineer, Charles A. Kitzinger, service engineer, and J. A. Crawley, office manager.

An agreement, applying only to the sale of industrial electro-chemical instruments and certain types of flowmeters, has been consummated between Leeds & Northrup, of Philadelphia, and George Kent, Ltd., of Great Britain. Under this agreement, Kent will not offer its industrial electro-chemical instruments or its flowmeters for sale in the U. S. or Canada unless through Leeds & Northrup, while Leeds & Northrup will not offer its similar instruments for sale in the British Empire (except Canada) unless through Kent.

Gray-Hercules

William S. Gray & Co. is handling Hercules' naval stores products in the Metropolitan area with Harry W. Siebert in charge.

Washington

¶*Chemical Developments of '34 and '35 Analyzed by Delahanty—C. D. 5 Ruling — Other Bills Introduced—*

Developments in the chemical field in '34 and the first quarter of '35 are analyzed by T. W. Delahanty, assistant chief of the chemical division in a recent *Survey of Current Business*. He reports:

"Substantial improvement in the chemical industry occurred during '34 and further gains were made in the first quarter of the current year. The industry has been quick to respond to the expansion in business activity and has in recent periods preserved the enviable record established during the depression. In part, this relative success has been owing to the initiative of the industry and the constant stream of new products and new uses emanating from the laboratories, which are an important and integral part of the industry.

Table 1.—Production of Chemicals

[Based on the data carried in the Survey of Current Business, excepting the statistics on sulfur, coal tar, phosphate rock, and potash, which represent Bureau of Mines annual totals]

	1933	1934	% change
Alcohol:			
Denatured (1,000 wine gal.)	73,816	95,386	+29.2
Ethyl (1,000 proof gal.)	138,189	180,194	+30.4
Methanol:			
Crude (gal.)	3,079,286	3,726,230	+21.0
Synthetic (gal.)	8,793,152	12,534,424	+42.5
Explosives (new orders) (1,000 lb.)	249,365	307,385	+23.3
Sulfur (long tons)	1,406,063	1,427,473	+ 1.1
Sulfuric acid[1] (short tons)	1,366,973	1,519,504	+11.2
Fertilizer, Southern States, consumption (short tons)	3,133,187	3,547,593	+13.2
Superphosphates (short tons)	2,694,870	2,868,016	+ 6.4
Pine oil (gal.)	2,830,093	3,548,678	+25.4
Rosin:			
Gum (receipts) (bbl. 500 lb.)	979,599	1,030,574	+ 5.2
Wood (bbl. 500 lb.)	430,160	505,224	+17.5
Turpentine:			
Gum (receipts) (bbl. 50 gal.)	257,682	247,403	— 4.0
Wood (bbl. 50 gal.)	68,440	81,688	+19.4
Paints, varnish, & lacquer products (sales)[2] (1,000 dol.)	222,761	282,463	+26.8
Paints:			
Calcimines (dol.)	1,578,498	2,699,545	+71.0
Plastic (dollars)	1,102,163	417,127	—62.2
Cold-water (dol.)	734,994	823,586	+12.1
Cellulose plastics (s, r, and t):			
Nitrocellulose (1,000 lb.)	11,919	12,360	+ 3.7
Cellulose acetate (1,000 lb.)	2,484	4,824	+94.2
Coal tar (1,000 gal.)	363,299	419,000	+15.3
Phosphate rock (long tons)	2,309,269	2,677,277	+15.9
Potash (K_2O) (short tons)	143,378	144,342	+ .7

"While '34 was not a census year and it is not possible to measure the extent of the gain in the value of products of the industry for that period, sufficient data are available to indicate that production was substantially higher than in the last census year, '33. Table 1 presents the production statistics for some of the leading items for '33 and '34. Numerous products not listed in the table were also produced in larger volume in '34 than in the preceding year. Alkali output was estimated to have advanced 4% in '34; production of caustic soda was estimated to have been larger than in any other year since '21, with the exception of '29. Ammonium-sulfate and coal-distillate production likewise increased, and synthetic camphor production exceeded 30% of domestic consumption. Numerous important chemical industries have not been mentioned in the foregoing paragraph because of the lack of current statistics."

[1] Produced by fertilizer manufacturers.
[2] Represents about 80% of total sales.

Alcohol Rulings and Notes

It is reported that the Treasury Dept. will shortly issue an order stopping the use of C. D. No. 5 alcohol, probably on July 1 but producers and dealers will be allowed to dispose of stocks until the end of the year. Present industrial users of the formula will have to resort to No. 5-A or No. 10. Agitation continues for a formula using methanol as a denaturant and further consideration is being given to this question by the Department.

In order to obtain time for additional supplies of the new chemical sucrose octa-acetate the new formulas for rubbing alcohol are postponed until July 1.

The Treasury Dept. was requested on May 7 by the House Judiciary Committee to rewrite into a single bill the several bills proposed for regulating the control of industrial alcohol production and sale.

Further Tax on Foreign Oils

Agricultural groups are backing a bill introduced by Rep. Kleberg, Tex., which would place a 10c tax per lb. on all margarine made from foreign oils. Another bill would fix minimum standard of quality.

Would Repeal Coconut Oil Tax

Rep. John F. Dockweiler (Calif.) introduces H. R. 8,000, a bill to eliminate the excise tax of 3c on inedible coconut oil from the Philippines. This tax was forced through Congress by the Agricultural groups and the reconsideration asked for by President Roosevelt was turned down, the tax becoming effective in May of last year.

Opposes Tin Processing Tax

The American Tin Trade Association is protesting against H. R. 7675, known as the McReynolds Bill which would among other things place a 6c processing tax on tin.

Du Pont Files with I. C. C.

Du Pont filed on May 8 a complaint with the Interstate Commerce Commission against 6 railroad companies, charging unjust and unreasonable rates on shipments of ground and pulverized limestone between points in West Viriginia and Pennsylvania and points in Pennsylvania and New Jersey. Railroads are the Baltimore & Ohio, Erie, New York, Susquehanna & Western, Pennsylvania, Western Maryland, and Reading.

Trade Commission

¶*Complaint Lodged Against Harry Schliftman—Yardley Files Denial—*

Unfair competition through use of a fictitious trade name is alleged in a F. T. C. complaint against Harry Schliftman, of N. Y. City, trading as Eagle Supply Co., who is said to have sold paint labeled as "Manufactured by Masterkraft Color Co., Brooklyn, N. Y."

Denying that it has ever published any false advertising, Yardley of London, Inc., Union City, N. J., files an answer to the Federal Trade Commission's complaint.

Customs and Tariffs

¶*Belgian Government Reduces Lard License Tax — Order on Iron Oxide Denied—*

The Belgian Government has decided voluntarily and without a return concession to reduce the import license tax on lard from 100 to 50 francs per hundred kilos, Count Robert van der Straten-Ponthoz, the Belgian Ambassador, informed the State Dept. on May 13.

Find No "Dumping"

Following an investigation, the Treasury Dept. announces that issuance of an anti-dumping order against iron oxide from England is not justified.

Recent Tariff Ruling

Tennessee Eastman.—Acetic acid residue resulting from the second distillation of acetate of lime subjected to sulfuric acid is held to be a waste as claimed at 10%. Duty had been assessed at 25% under the tariff provision for "all other acids and acid anhydrides not specially provided for."

'34 Explosive Figures Ready

Final '34 explosive production figures are released by the Bureau of Mines, Washington. Copies are available.

Heavy Chemicals

¶Demand Slackens Somewhat as Uncertainties Appear on the Business Horizon — Dow Launches Calcium Chloride Advertising Drive — New Epsom Salt Producer—

Seasonal slackening appeared in the industrial chemical markets becoming particularly marked in the last week or 10 days of the 30-day period. The textile centers continue to operate at a very slow pace although some increase in cotton cloth production was reported in the month and rayon production is fair. Business has passed through another "trying" period, what with the soldiers' bonus and the Supreme Court's decision on NRA. This uncertainty is being felt in the volume of materials changing hands.

Seasonal items are in good demand. Tonnages of calcium chloride contracted for are encouraging; shipments of chemicals for water purification purposes, such as chlorine, alum, etc., are moving out in large quantities; a pick-up is reported in anhydrous ammonia; the agricultural insecticides are more active and the price structure basically unchanged.

Price changes in the last 30 days are relatively few. The spot price for anhydrous ammonia in cylinders was advanced 1½c. Barium chlorate is 1½c higher, while sodium hydrosulfite is off 1c to 18c in large quantities. Tin crystals and the tetrachloride are higher as a result of further advances in the price of the base metal. Both di- and tri-sodium phosphates are firm at the recently advanced prices.

Automotive production declined somewhat in May from the April figures (to about 400,000 units from the 475,000 of April) but activity in the Detroit area remains one of the very encouraging spots. Further seasonal curtailment is expected for June, July and the first few weeks in August. The tire centers are showing signs of summer dullness too, but activity in the paper and glass industries, while below the year's high points, is still reported at satisfactory levels. Steel activity is down slightly to about 42% of capacity.

Fighting Dust

An extensive newspaper drive, directed to an audience believed to be unusually receptive by reason of recent dust storms, will be launched shortly by Dow Chemical to further its educational campaign on Dowflake, for the elimination of dust.

New In Epsom Salt

United States Chemical Co. is now manufacturing Epsom Salt at 649 W. Pratt st. Baltimore. David Bressler is manager.

Important Price Changes

ADVANCED

	May 31	Apr. 30
Barium chlorate	$0.15½	$0.14
Tin crystals	.39	.38
Tin tetrachloride	.26½	.26

DECLINED

Sodium hydrosulfite	$0.18	$0.19

A Baltimore Dealer

Brookline Chemical Works, Inc., Baltimore, is a new company and will deal in alkalies and chemicals. Capital stock consists of 100 shares of common of no par value. Bernard A. Freudenthal, Robert M. Chapman and Leon Chor are the incorporators.

Checking with the Producers

A barge load of Michigan Alkali soda ash moved by a new all-water route from the company's plant at Wyandotte to Boston. Consignee was the AAC.

Chemical pulp plants in Maine are in dire straits. Recent reductions of $5 a ton in foreign pulp has forced many mills to shut down completely.

Phosphate Products Corp, of Richmond, Va., is opening a N. Y. City sales office with H. Muller Touraine in charge. Office is at 233 Broadway. Products offered include tri- and di-sodium phosphate and phosphoric acid.

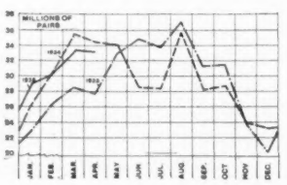
Mathieson leases a 300-acre tract at Burnet, Tex., said to contain extensive dolomite deposits.

It is rumored that Texas Gulf Sulphur may assume operations and possible control over the Leviathan Sulphur Co., Los Angeles, Calif.

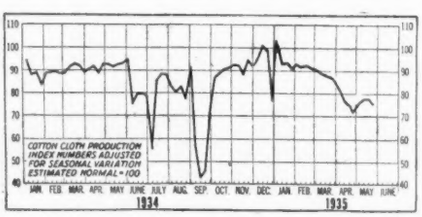
Textile and Tanning Chemicals

¶Textile Field Continues Below Normal — Shoe Production Declines Seasonally—Egg Products Scarce—

The textile field continued below normal and the decision of the Supreme Court on NRA added fresh uncertainty to the confusion. A slightly better rate of production prevailed in certain sections of the cotton cloth centers and stocks are lower, but the industry at the end of May was operating at a rate of about 5% below the April average. Rayon production remain satisfactory. Tanning operations remain at about the same or slightly higher level than prevailed in April; shoe production, on the other hand,



Shoe production is now below the level prevailing last year



—N. Y. Times

Cotton cloth production again falls back after a temporary gain

according to preliminary advices, is down, and is now definitely under the rate for the corresponding period of last year.

Important Price Changes

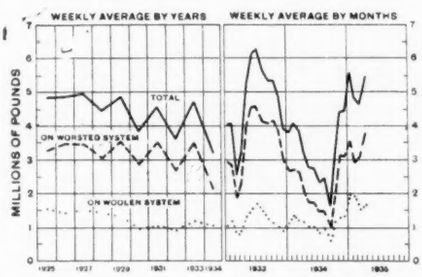
ADVANCED

	May 31	Apr. 30
Albumen, egg	$ 1.05	$ 0.95
Egg yolk	.63	.59
Sumac, Italian	60.00	59.00
Zinc dust	.063	.061

DECLINED

Mangrove bark	$29.00	$29.50
Myrobalans, J1	23.25	24.50
J2	14.75	15.00
Valonia beards	41.00	43.00
Cups	26.00	26.50

Price changes last month were largely restricted to the natural tanstuffs and were mostly the result of currency fluctuations. Egg albumen and egg yolk were sharply higher. Stocks were small (up to the last week of the month) and the demand good. Bichromates are moving out in good tonnages but this is due more to the call from the paint field rather than from any decided improvement in either the tanning or textile trades. Sulfonated oils are more competitive. Zinc dust prices are higher as a direct result of higher quotations for the metal.



The consumption of apparel class wool—1925-35. A gain in the last month or so is apparent.

While consumption of dyes is not satisfactory prices for the most part on synthetic dyestuffs are holding up remarkably

well. The tanning trade was informed last month that quebracho prices have been renewed for the 3rd quarter and that no change in the extract price is expected for the rest of the year. Dextrin and corn starch quotations remain unchanged from last month's levels.

Du Pont at the Cotton Show

By far the most comprehensive exhibit it has ever prepared for such a purpose was presented by duPont at the National Cotton Show, held at Memphis, May 6-11. The duPont Co., representing the chemical industry at the Southern exposition, took one entire side of the Cottonseed Products Building to show how closely its interests are bound up with the cotton business. More than 150,000 persons visited the display during the week.

Fall Colors Announced

Regular edition of the '35 Fall Woolen Card, portraying 48 colors in woolen fabrics, is released to members of the Textile Color Card Association.

Twelve new colors are shown in the '35 Fall Hosiery Card just issued by the Association.

The Machine in Industry

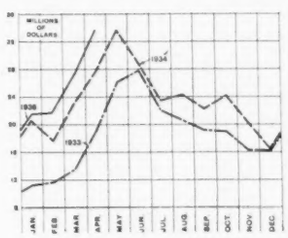
A challenge to the machine producing industries to develop the machine still further in order to bring about a greater and more uniform use of mechanical devices, as a means of increasing the output per worker employed by industry and consequent broadening of the distribution of products and increase in employment, is indicated in a study by the National Industrial Conference Board for the National Machine Tool Builders Association.

In this study the position of the chemical industry shows up very favorably. The rate for the industry was only exceeded by the paper, petroleum and coal, and iron and steel, clay and glass groups. The figures for the years 1914, 1919, 1923, 1925, 1927 and 1929 are shown below.

Paints, Lacquers and Varnish

¶Lead Pigments Sharply Higher —Paint Sales Continue to Run Ahead of '34 Corresponding Figures—Building Outlook Better—

A steady rise in lead quotations last month forced several upward revisions in prices for red lead, litharge, and orange mineral. Zinc prices have been advancing too, but no important price revisions in zinc pigments were announced. Contracts on zinc oxide and lithopone for the last 6 months of the year are reported being renewed at unchanged levels. It is further expected that producers of titanium pigments will follow suit. A rise in barytes was reported, and attributed to higher ore costs and higher freight rates. Argentine casein was advanced a ¼c per lb. when stocks became low and the demand improved. The competitive position of the imported material is better.



—Bureau of the Census

The trend in paint sales continues to show encouraging gains over last year, and the immediate outlook is promising despite the uncertainties caused by the sudden ending of NRA

Several price changes were reported in the varnish gums, a number were the direct result of the devaluation of the Belgian currency; others, too, were based on fluctuations in foreign currency exchange rates.

The forced ending of NRA added considerable confusion to the markets for many raw materials. Practically all contracts for these items are written on either a quarterly or semi-annual basis and buyers are wondering what effect if any the demise of the codes will have on the price structure for the last 6 months.

Important Price Changes

ADVANCED

	May 31	Apr. 30
Barytes, wks	$30.65	$30.00
Casein, Argentine	.13¼	.13
Lead, red, 95%	.0675	.0625
97%	.0700	.0650
98%	.0725	.0675
Litharge	.057/8	.051/4
Orange mineral	.093/4	.091/4
Whiting, precip.	15.00	12.00

Dodge Building Statistics

Residential building continues to reflect encouraging improvement. For the initial half of May, contracts let for this class of construction were approximately 80% ahead of the total shown in the corresponding period of May '34. For the 37 states east of the Rocky Mountains F. W. Dodge Corp. reports a residential building total of $22,072,500 for the first 15 days of May; during the first half of April the total was $20,610,900 while for the initial 15 days of May, '34, the volume was only $12,421,500.

The contract total for all classes of construction inclusive of residential building amounted to $60,961,300 for the initial half of May as against $61,969,900 for the first half of April and $67,181,400 for the first 15 days of May '34, the Dodge organization reports.

The April construction contract volume exceeded the total for March by a small margin. A loss from the volume reported for April of last year was shown, however, due to a falling-off in awards under the old PWA program. April contracts totaled $124,098,000 as against $122,940,500 for March and $131,157,000 for April, 1934.

Despite the loss from a year ago in total construction residential building contracts during April were higher than for any other month since the closing months of '31. Private construction in April as apart from public work, made the best showing in more than three years with only one exception.

Gains in residential building were shown in April in each of the principal geographic territories as compared with last year except for the New England and the New Orleans areas. Residential contracts let during the first 4 months of '35 in the 37 states totaled $113,517,200 as against only $80,342,500 for the corresponding 4 months of '34. Commenting on the outlook the *Dodge Bulletin* states:

"This improvement over a year ago in residential building bids fair to continue for the remainder of the current year judging from the figures on contemplated projects. Contemplated residential build-

Manufacturing Industries

Horsepower per Wage-Earner, by Industry Groups, 1914-1929

Group	1914*	1919*	1923	1925	1927	1929
Food and kindred products	4.7	4.4	5.5	5.8	6.1	6.1
Textiles and their products	1.8	2.0	2.2	2.4	2.5	2.4
Forest products	3.7	3.9	3.6	3.8	3.9	4.2
Paper and allied products	10.2	9.5	10.6	11.6	12.5	13.6
Printing, publishing and allied industries	1.2	1.3	1.4	1.5	1.7	1.8
Chemicals and allied products	5.6	5.2	6.7	7.1	7.3	8.2
Products of petroleum and coal	5.1	5.4	7.9	9.1	10.7	11.9
Rubber products	2.7	2.7	4.4	4.7	5.6	5.5
Iron and steel and their products not including machinery	7.4	7.5	8.1	8.8	10.0	10.4
Leather and its manufactures	1.0	1.1	1.2	1.3	1.3	1.4
Store, clay and glass products	4.4	5.2	5.5	6.7	7.7	8.7
Non-ferrous metals and their products	2.3	3.1	3.9	4.2	4.5	5.0
Machinery, not inc. transportation equipment	2.0	2.1	2.5	3.2	3.4	3.3
Transportation equipment, air, land and water	1.9	1.7	2.7	3.4	4.1	3.9
Railroad repair shops	1.3	1.3	1.5	2.1	2.6	2.9
Miscellaneous industries	1.0	1.5	1.5	1.7	1.9	1.6

* Includes data for establishments reporting products valued at less than $5,000.

ing reported in April amounted to $99,721,900 as against only $54,483,000 for March and $55,074,300 for April of last year."

A Wider Loan Field

On May 28 the President approved an amendment to the National Housing Act permitting the insurance of loans on practically every type of structure except private family dwellings, in amounts up to $50,000. This opens a vast new field for modernization effort.

Krebs' New Pigments

Krebs Pigment and Color will produce 3 new pigments at the new plant in Edge Moor, Del., when the plant goes into operation about June 10. Edge Moor is located on the Delaware River about 3 miles north of Wilmington. Main office of the company was recently transferred from Newark to 1007 Market st., Wilmington.

These new pigments will be called Ti-Cal Lo, Ti-Cal-Ho and Ti-Bar and are extended titanium pigments, having calcium sulfate and barium sulfate bases as indicated by their respective names.

New plant, modern in every detail, comprises 20 buildings. Design and equipment have been selected to assure exact control of the sensitive processes involved in the manufacture of uniform pigments of the highest quality.

Jargstorff with Smith

George W. Jargstorff formerly with C. K. Williams of Easton, is now affiliated with Smith Chemical & Color of Brooklyn. Mr. Jargstorff was previously associated with U. S. Rubber Company at the general research laboratories and with the Plastics Industries, Inc. of Newark. His experience covers the development and use of fillers, pigments, chemicals and general compounding ingredients for paints, lacquers, rubber, plastics, linoleum and flooring products. Mr. Jargstorff will handle the sales of colors and chemicals in the Eastern district.

Colledge as Sales Agent

E. W. Colledge, Inc., general sales agent, Cleveland, naval stores, is named representative in that territory for Metro-Nite Co., Milwaukee, paint pigments, and Atlas Refining, Newark, N. J., processors of fish oils.

Paint Exports in First Quarter

Exports of paint products including pigments reached $3,671,800 during the first quarter—an increase of 28% over the same period of last year. Shipments of mineral earth pigments showed little change but chemical pigments, which includes carbon black, advanced 40% in quantity to 37,152,000 lbs. and more than 32% in value to $1,909,750, compared with the first quarter of last year, statistics show.

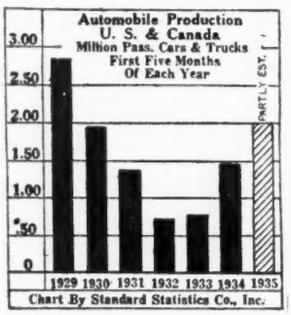
Foreign sales of ready mixed paints, stains and enamels also registered substantial gains—quantity increasing 34% to 548,700 gals. and value 26% to $931,660. Lacquers showed little change compared with the first three months of '34, but varnishes increased 16% in value to $117,000.

Dow profit sharing checks were issued last month to Dow employees, the first since last July.

Solvents

¶Petroleum Solvents Advanced in the Mid-Continent Field—Outlook for the Tire Industry—New Solvents Announced—

At the end of April several of the producers of petroleum solvents in the mid-continent area indicated that a strengthening of the price structure was imminent. Most of the producers placed advances in effect in the third week of the month, and at the close, one of the leading factors instituted a further advance of another quarter of a cent a gal. Such action leaves a rather wide spread in quotations and the range for the more important solvents are given as follows: V. M. & P. naphthas, 6⅞-7⅛c; cleaners naphthas, 6⅞-7⅛c; lacquer diluents, 7⅞-8c; petroleum thinners, 5⅞-6⅛c; rubber solvents, 6⅞-7⅛c; Stoddard Solvent, 6⅜-7c.



Improvement in the automotive field is graphically shown

Demand continues good for lacquer diluents. May production of cars was in the neighborhood of 400,000 units, and the outlook is for a total of 350,000 in June. The naphthas and Stoddard Solvent are also moving out in satisfactory quantities.

$125,000,000 Tires for '35

According to J. W. O'Meara, assistant general sales manager, R. L. Polk & Co., the automobile industry will buy approximately $125,000,000 worth of tires and tubes from the rubber industry as original equipment for 1935 cars. In '33 the motor industry purchased $75,000,000 worth of tires and tubes as original equipment. Prediction for '35 is based on the steadily rising market prices on tires, combined with substantial increases of motor car sales visualized for the current year. Production of automobiles in 1935 is estimated to be 3,500,000 including trucks.

Novel Solvents Available

U. S. I. reports production of amyl propionate an important addition to the group of high boiling solvents for nitrocellulose.

Hydrogenated naphthas are now being produced at Standard's Bayway plant.

Shellac

¶Indian Lac Exports Expand in '34 with Bulk Going to London —Shellac Markets Quiet—

A notable increase in India's lac exports during '34 is revealed in a report to the Commerce Dept. from Trade Commissioner George C. Howard, Calcutta. Total shipments abroad in that year amounted to 724,479 cwt., compared with 564,423 in '33 and 437,600 in '32. Shipments of shellac to the United Kingdom during the past year were far in excess of those of preceding years. Shellac exports to the British market in '34 totalled 379,858 cwt. compared with 194,126 in '33 and 106,967 in '32.

Indian exports of lac to the U. S. during '34 decreased as compared with the 2 preceding years, the total being approximately 161,000 cwt. compared with 189,000 in '33 and 165,000 in '32. Principal decrease was in seed lac which declined from approximately 101,000 cwt. in '33 to approximately 78,000 in '34, although a small decrease was also registered in shellac.

Statistical position of the market does not promise well for India's exports of lac during the next few months, report states. The large stocks held in London, the slow U. S. demand and increased production in Siam are factors which render the immediate future outlook for Indian lac rather uncertain and the price situation weaker than it has been since before the bull market began over a year ago.

Domestic consumption in British India during '34 was estimated at 14,000 cwt. One-third of the total was used in the manufacture of phonograph records, the remainder being utilized by paint and varnish makers.

Domestic Shellac Prices

Shellac markets failed to rise out of the "doldrums" last month. Prices, however, are slightly higher than at the close in April.

Plants

E. J. DePree is named St. Louis plant manager of Monsanto Chemical; B. E. Thomas manufacturing superintendent; A. J. Pastene, P. G. Marsh, E. T. Stehlby and W. G. Krummrich named operating superintendents.

Chemical Specialties

¶P. & G. Advance Soap Prices—Shoe Polish Formulas Attacked—Food and Drug Bill Passes the Senate—Feld-Crawford Bill Signed by Gov. Lehman—

Procter & Gamble advances prices of Ivory soap, its largest selling brand, 5%. Naphtha soap and 4 unadvertised brands also have been advanced, increases ranging from 2% to 5%.

Since the federal excise tax on imported soap oils became effective on May 10, '34, P. & G. has advanced soap prices 4 times, with the current adjustment making Ivory soap prices around 25% higher than the May, 10, '34, level and prices of other P. & G. soaps around 15% to 20% higher.

P. & G.'s general price level does not yet fully reflect the excise tax, which added around 25% to soap production costs. Stronger markets for raw materials used in soap making, particularly tallow, together with the excise tax factor, indicate that further soap price advances are likely.

Blames Shoe Polishes

Hide and Leather is attacking editorially products of shoe polish manufacturers, claiming that chemical analysis of "all the widely distributed brands sampled, disclosed high alkaline content and that repeated use destroyed a considerable portion of the instrinsic acidity necessary for the preservation of chrome tanned leather."

New Chemical Specialties

"Chroma," a new cleaner and polish for chromium, is being made by the D. & R. Mfg. of Niagara Falls.

Sorb is a new refrigerator deodorizer put on the market by the Rocke International Corp., N. Y. City.

Chicago Sanitary Products Co. is now marketing "Pynex," a new floor cleanser.

Advertising Programs

B. T. Babbitt, Inc., (N. Y. City) advertises on the Coast a money-back guarantee to push Bab-O, giving a Monax Mayonnaise Bowl free with each purchase of 2 cans as an introductory gesture.

Charles M. Hatcher, Philadelphia, manufacturer of Nero shoe polish, starts a newspaper advertising campaign through Sidney H. Weiler Advertising Agency of that city.

S. C. Johnson & Son, Racine, manufacturers of Johnson's Floor Wax, will introduce "Fibber McGee and Mollie," a new comedy team over a coast to coast network.

ENTER A NEW CLEANER

This fall, advertising on a new product, which has been successful in getting 90% distribution in the one area where it has been introduced, will be extended to key cities east of the Mississippi. Product has its origin in the search for a cleaning fluid which would serve 2 purposes; all-purpose cleaner and, priced as to permit its use in cleaning all of an item instead of just a spot or a soiled area.

Drug Bill Before the House

A greatly modified Food and Drug bill passed the Senate late last month and now goes to the House. Whether it can get through the House now appears quite problematical with the whole New Deal legislation program now in a state of uncertainty following the Supreme Court's decision on the NRA.

Indian Soap Market

The possibility of appreciably expanding the sale of American soaps in India is indicated in a report to the Commerce Dept. from its Calcutta Office.

N. Y. Price-Fixing Legal

With the signing of the Feld-Crawford Bill by Governor Lehman, New York becomes the 6th state to adopt legislation to permit manufacturers of trade-mark goods to fix the retail prices of their products. New Jersey passed a similar bill recently.

Trade-Mark Laws Introduced

The N. J. Legislature now has before it a compulsory trade-mark law similar to the one recently vetoed in Nevada and the one recently vetoed by the Governor of N. Y. State.

Personal & Personnel

Samuel C. Zirlin, sales manager of Marine Laboratories, is on an extended trip visiting various sales agencies located at the main seaports. Company specializes in water treatment materials for marine boilers and in other chemicals used aboard vessels.

P. E. Falkingham, well-known in the chemical field, is now eastern sales representative for McLaughlin, Gormley, King of Minneapolis, and will handle a complete line of basic materials for the insecticide field.

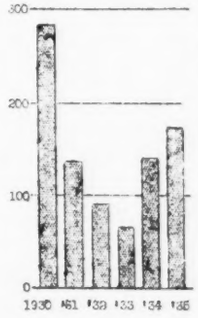
New Soap Producer

Rich Soap & Chemical has been established at 1218 Ridge ave., Philadelphia, Pa., under the management of Philip Goldrich and Paul Freidhoff.

Fertilizers

¶Domestic Potash Producers Announce Prices—Current Convention One of the Most Important in the History of the Industry—

The outstanding development in the fertilizer industry last month was the announcement of prices by the domestic potash producers, including American Potash & Chemical, U. S. Potash, and Potash Co. of America, following the earlier announcement by the leading importer. With a definite understanding between both the Spanish and Soviet producers with the German-French Cartel, a more stabilized price structure is anticipated. But for the time being actual sales are reported as being extremely light.



Imports of potash materials January-March (thousands of long tons)

Important Price Changes

	May 31	Apr. 30
ADVANCED		
Blood, dried Chgo.	$2.85	$2.75
DECLINED		
Blood, dried, N. Y.	$ 2.70	$ 2.85
Castor Pomace	17.00	17.50
Fish meal, dom.	39.00	41.00
Nitrogenous material, imp.	2.25	2.40
East	2.25	2.40
West	1.90	2.00
Tankage, Unground, N. Y.	2.35	2.50
Chgo., fert.	2.30	2.40

The organic ammoniates were again weaker last month and further price declines were reported. Other reductions of importance were a 50c a ton decline in castor pomace, and a $2.00 a ton decline in domestic fish meal.

The trade is awaiting with interest the issuance of sulfate and nitrate prices. No definite word has as yet been received, however, of what will happen to the

GALLIC ACID U.S.P. and TECH.

for use in dyeing, tanning, paper manufacture, photo-engraving, and pharmaceuticals

OTHER EASTMAN CHEMICALS:

Cellulose Acetate
Hydroquinone
Nitrocellulose Solutions
Pyrogallic Acid
Silver Nitrate

•

Research Organic Chemicals

EASTMAN GALLIC ACID is produced on a large scale as an intermediate in the manufacture of the photographic developing agent, pyrogallic acid.

EASTMAN GALLIC ACID is offered to the trade in two forms: U.S.P. and Technical. Years of experience in its preparation and the use of fine raw materials assure users in all fields of a uniform, high quality product.

EASTMAN GALLIC ACID is always fresh. Continuous photographic demands enable us to make prompt shipments from fresh stock.

Information and samples will be furnished upon request. Eastman Kodak Company, *Chemical Sales Division*, Rochester, New York.

NRA CODE

EASTMAN TESTED CHEMICALS

ABC

Cellulose Acetate
Cresylic Acid
Sodium Acetate
Acetic Anhydride
Casein

Dibutyl Phthalate
Diethyl Phthalate
Dimethyl Phthalate
Triphenyl Phosphate
Triacetin

AMERICAN-BRITISH CHEMICAL SUPPLIES, Inc.
180 MADISON AVE., NEW YORK, N.Y.

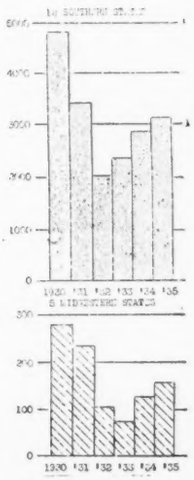
Associated Company
CHAS. TENNANT & CO. (CANADA) LTD.
372 Fay Street, Toronto 2, Canada

Nitrogen Cartel. It is reported from abroad that the principal factors have already held several meetings in various cities on the Continent, but until final decisions are reached, there is little likelihood of price announcements.

The N. F. A. meeting opening at White Sulphur on the 10th of this month takes on added importance following the Supreme Court's adverse ruling on the constitutionality of NRA. The fate of the AAA is also very much in doubt. Crowded sessions are definitely assured at the business meetings while the industry struggles to find a workable substitute.

Fertilizer Sales

Fertilizer tax tag sales in 12 Southern States in April, as reported to The N. F. A. amounted to 704,348 tons. It is necessary to go back to '26 to find another April in which sales were this low. Tag sales in April were less than one-half of the amount reported for March; the seasonal decline which occurred from March to April was much larger than that which usually takes place.



Fertilizer tag sales Jan.-April combined (thousands of equivalent tons)

Ten of the 12 states reported smaller sales in April of this year than in the same month of '34, with the declines particularly marked in South Carolina and Alabama. Sales in Mississippi were more than twice as large as last year and Georgia also reported a sizeable increase.

Sales for First 4 Months

For the first 4 months of the year sales in the South aggregated 3,140,197 tons, an increase of 9.8% over the corresponding period of '34 and 33 % over the first 4 months of '33. As indicated by the adjoining chart, however, this year's sales have been well below the 1931 level and very substantially below the peak year of '30. Arkansas has been the only one of the Southern States to report smaller sales this year than last. The largest increases have been made in North Carolina, Georgia, Florida, Alabama, and Mississippi.

January-April sales in the last 4 years have accounted, on the average, for 80.0% of the total year's sales. Range has been from 75.4 % in '33 to 84.1 % in '31. In '34 ratio was 80.6%. April sales in the last 4 years were responsible for 28.4% of the annual total, but in '32 and '33 April was the peak month. In '34 April accounted for only 21.5% of the year's sales and for this year the ratio will probably be less than that.

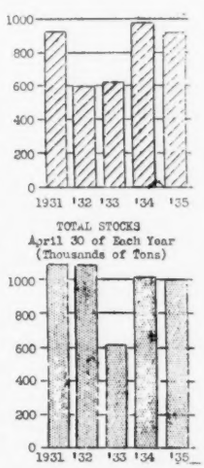
Tag sales in Southern States for the cotton crop year to date, from Aug. 1 through April, amounted to 3,600,485 tons.

April tag sales in the 5 reporting midwestern states totaled 39,437 tons, a loss of 8.3% from April, '34, but a gain of 45.4% over April, '33. Decline from last year was largely due to smaller sales in Kentucky; the declines in Illinois and Kansas were relatively unimportant. Indiana and Missouri reported sales slightly larger than a year ago.

For the last 4 months of the year the Midwest showed a gain of 22.7% over last year and were more than twice as large as in the same period 2 years ago. All of the States have experienced larger sales than last year but the increase for the area has been largely due to improved sales in Indiana. April sales in the Midwest in the last 4 years accounted for 18.5% of the year's total and sales in the January-April period for 52.6%.

Superphosphate Production

Production of superphosphate in April, according to reports by acidulators to N. F. A., amounted to 165,681 tons, representing a decline of 11.3% from production in April, '34. Both the Northern and Southern Areas reported declines from last year but the drop was sharper in the South. For the first 4 months of this year production was 6.1% less than in the corresponding period of '34, the result of a 10.3% increase in the Northern Area and a 16.9% decrease in the Southern Area. The trend of production has been generally downward since last June.



Superphosphate production first 4 months of each year (thousands of tons)

April is the Peak Month

April is the peak month of the year in shipments. Shipments to mixers as well as to consumers, in April of this year were not only under last year's figures but were also the lowest for the month for at least the last 5 years. Shipments to consumers were 21.0% under April, '34, while shipments to mixers showed a decline of 14.1%. Shipments to consumers in the first 4 months of this year ran under last year by 16.2%; shipments to mixers have slightly exceeded last year.

There was a seasonal decline in stocks on hand during April, decline in total stocks amounting to 26.6%, compared with a decrease of 28.7% in April, '34. During the past year there was a decline of 0.4% in total stocks, the result of a 5.5% rise in the Northern Area and a 4.7% decline in the Southern Area.

A Potash Institute

American producers and importers of potash salts announce the organization of the American Potash Institute, which will be established in Washington at an early date.

Dr. J. W. Turrentine, for years past in charge of Potash Researches of the Bureau of Chemistry and Soils, U. S. Dept. of Agriculture, is president. Dr. Turrentine has long been well known in America and Europe for his numerous researches, writings, and addresses on potash and other fertilizer subjects and his activities in connection with the development of the American potash industry.

G. J. Callister, director of the Agricultural and Scientific Bureau, N. V. Potash Export My., Inc., and for 24 years connected with the educational work of the potash industry, will be vice-president and secretary. Both Messrs. Turrentine and Callister will sever their connections with their respective organizations when the Institute is established. It is contemplated that branch offices of the Institute will be established at Atlanta; Lafayette, Ind.; San Jose, Calif.; and Hamilton, Ont.

American Potash at Savannah

The first cargo of American manure salts to arrive in Savannah was shipped in the *Eastern Sword*. The shipment, made by the Potash Co. of America, arrived on June 3.

Naval Stores

As with most of the commodity markets naval stores had a weak spell following the publication of the Supreme Court's ruling on the NRA. However, President Lynn P. Talley of the Commodity Credit Corp. reports that the naval stores agreements, the sales allotments and the loan policy of the C. C. C. were not disturbed by the NRA opinion. Prices at the close of the month compare with those prevailing at the close on Apr. 30 as follows:

SAVANNAH ROSIN

	April 30	May 31
B	$3.40	$3.40–45
D	3.75–80	3.80–85
E	3.90–4.05	4.00
F	4.35–37½	4.25–30
G	4.45	4.45
H	4.45–47½	4.45–47½
I	4.45–47½	4.45–47½
K	4.45–50	4.50
M	4.50–55	4.50–55
N	4.85–90	4.95
WG	5.15–25	5.25
WW	6.10	6.20–25
X	6.15	6.25
Turpentine	.47¼	.46

Many of the processes employed in the refining of coal tar products have been developed by the Koppers companies. A competent technical staff is constantly at work to introduce further process refinements and to insure the high quality of all Koppers products. The Koppers laboratories are abreast of all new developments in the field of coal tar products. Their services are at your command.

- **BENZOL** (All grades)
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- **SOLVENT NAPHTHA**
- **PHENOL** (82% and 90% Purity)
- **CRESOL** (U. S. P., Resin and Special Fractions)
- **CRESYLIC ACID** (98% Pale, low-boiling)
- **NAPHTHALENE**

(For construction and maintenance, Koppers also produces: Roofing, Waterproofing, Dampproofing, Creosote, Tar Base Paints and Coatings, and Tarmac for driveways, roads, pavements, etc.)

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Church & Dwight, Inc.

Established 1846

80 MAIDEN LANE NEW YORK

Bicarbonate of Soda

Sal Soda

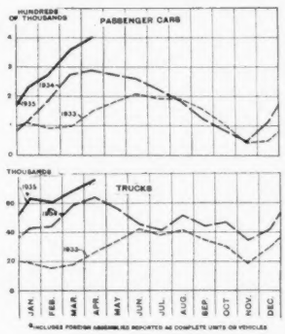
Monohydrate of Soda

Standard Quality

Coal Tar Chemicals

¶Stocks of Toluol, Xylol and Solvent Naphtha Continue Scarce—Benzol Price Unchanged — Demand is Spotty—

Scarcity of spot stocks of toluol, xylol, and solvent naphtha continues without change. Benzol quotations are again renewed at unchanged levels, but producers were only quoting through July instead of on a quarterly basis. Crude and refined naphthalene prices are firm and shipments heavy. With the production of automotive units holding at 400,000 last month the demand for solvents in both the lacquer and rubber centers continued with but very little abatement. This was only 75,000 less than the April total. A rather sharp decline is expected, however, in the immediate months to come but June production is expected to reach 350,000 units. Intermediates were in fair demand last month considering the slackened pace in the textile field. Creosote oil shipments are in larger volume. A bad infestation of chinch bugs in the mid-west states promises to help consumption. The Dept. of Agriculture has just appropriated $2,500,000 for this work.



With automotive production at a high level demand for solvents has been extremely heavy

April Coke Figures

A further decline marked the production of coke in April. Output of both beehive and by-product coke amounted to 2,736,723 tons, or 91,565 tons per working day. This represents a decrease of 6.4% in comparison with the March rate of 97,813 tons, and is the lowest rate recorded for the present year.

Output of by-product coke for the 30 days of April was 2,670,223 tons, or 89,007 tons per day. Compared with March, April rate fell off 5.2%. Bulk of the decrease occurred at furnace plants, where the daily average was 6.4% less than that of the preceding month. At merchant plants the rate was 3.2% below that of March. A decline of 2.9% was reported in the pig iron industry.

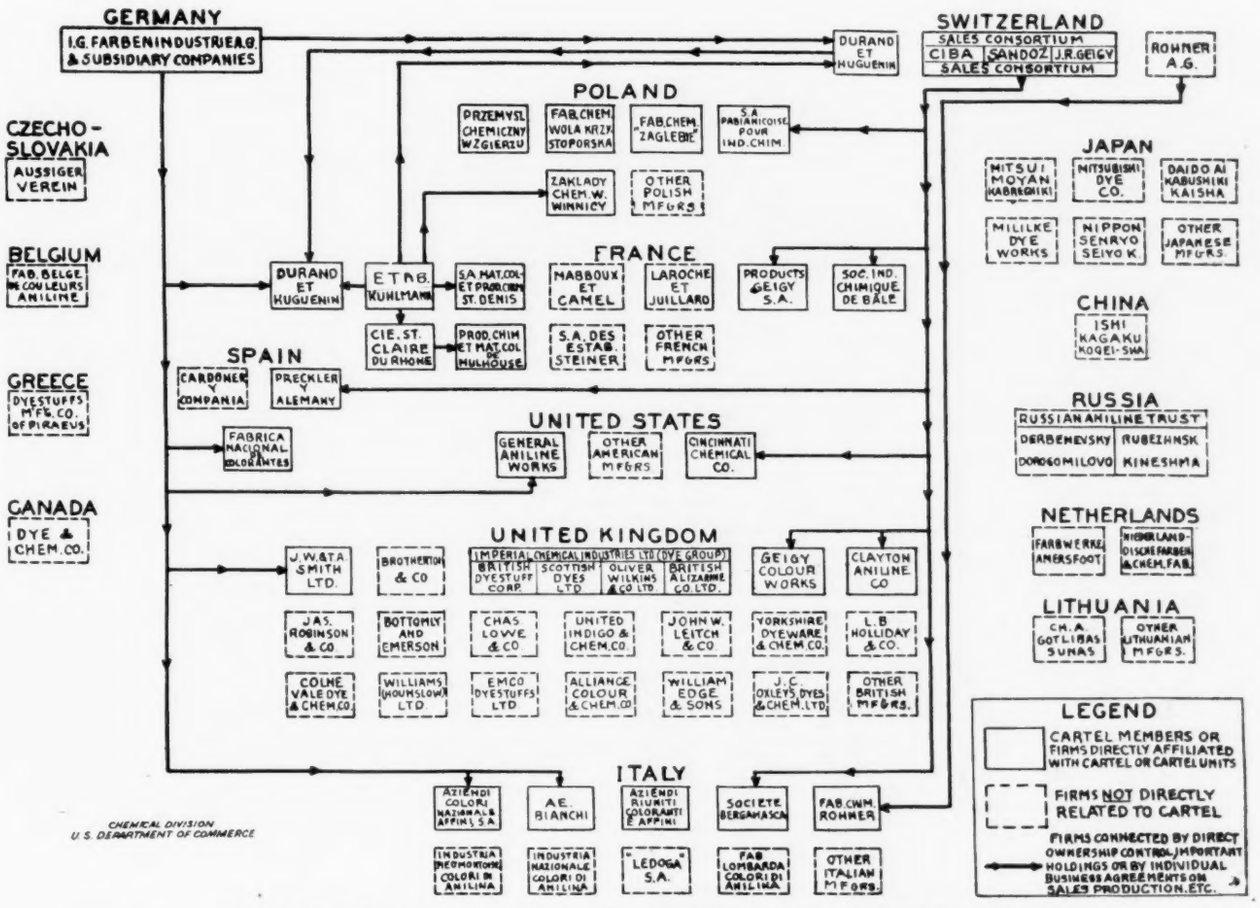
Production of beehive coke dropped sharply, from 101,400 tons in March to 66,500 tons in April. Decrease in the daily rate amounted to 34.4%.

Stocks at by-product plants rose from 2,960,823 tons to 3,019,016 tons, or 2.0%. Stocks at the end of the month were equivalent to 33.9 days' production at the current rate.

April tar recovery totaled 36,031,443 gals. as compared with 39,355,451 in March and 39,283,769 in April last year. Total for the first 4 months was indicated at 150,836,925 gals. as compared with 147,578,935 in the corresponding period a year ago. Light oil yield was reported at 9,338,870 gals. in April as compared with 10,408,860 in March and 10,399,882 in April a year ago. Total for the first 4 months was 39,932,166 gals., against 39,069,696 in the same period of '34.

Synthetic Dye Imports

U. S. April imports of synthetic dyes showed a decline from the preceding month of 106,755 lbs. in quantity, and a decrease in value of $161,959, total figure for April being 207,185 lbs., against 313,940 in March, with a value of $271,185, against $433,144. This is a drop of 34%



Coal Tar Dye Manufacturers in Producing Countries of the World Showing Cartel Participation.

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Paraldehyde
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ALUMINUM ACETATE 20% SOLUTION

SPECIFICATIONS

Aluminum Acetate	19.5% to 20.8%
Al_2O_3	4.9% to 5.2%
Free Acid	½% maximum
pH	3.3 minimum
Chlorides	Negligible
Sulphates	Negligible
Color	Water white to pale yellow
Sp. G.	1.087 to 1.093 @ 20°C.
Weight	9.1 lbs. per gal. @ 20° C.

CONTAINERS

Non-returnable	Net Weight
10 gal. Kegs	90 lbs.
50 gal. Barrels	450 lbs.

There are no shipping restrictions

The waterproofing of textile products may be carried out with NIACET ALUMINUM ACETATE alone or in conjunction with wax emulsions. Laundries find better results are secured with less material in the waterproofing of fabrics against dampness, rain, perspiration, or accidental spillage when using Niacet Aluminum Acetate.

Paper products may be waterproofed throughout or on the surface only by similar treatments. When Niacet Aluminum Acetate is applied to glue sized or glue surface treated papers the glue is insolubilized and the surface becomes remarkably water repellant.

In dyeworks it functions as a mordant for cotton dyes, and as a base for color lakes, and finds further application in printing fabrics.

Basic Aluminum Acetate powder and a 30% Aluminum Formate Solution are also available. Samples of these products and quotations on your requirements furnished on request.

NIACET
CHEMICALS CORPORATION
Sales Office and Plant ❖ Niagara Falls, N. Y.

in poundage, and 37% in value. April imports of this year showed a drop of more than 34% from the poundage of April, '34, and a decrease in value of more than 39% from that of the same month of last year.

Coal Carbonization Plant

International recognition was given the plant of the Coal Distillation Co. of West Virginia when F. B. Richards of London, England, representative of a group of British coal men, accompanied by a group of Wheeling district coal operators visited the plant and watched it in operation.

Mr. Richards is in this country making a survey of coal carbonization, and he said he found the local plant, the only one of its kind in the world, to be very interesting. He refused to commit himself on the future of coal carbonization but admitted that there are great possibilities in coal distillation.

Mr. M. J. McQuade of Pittsburgh, president of the company, J. Dorsey McQuade, superintendent of the plant, and John E. McQuade, superintendent of the Panama mine, conducted the party on the tour and inspection of the plant.

Plant, erected in '28 as an experimental project, through a process of carbonization removes the tar and gas from coal and leaves a fuel suitable for domestic and industrial use. Creosote and acid oils, sheep dips and disinfectants are made from the tar at the plant.

Mr. Dorsey McQuade explained that the coal industry is looking for something to do with the coal besides mining and burning it.

Benzol Labels Agreed Upon

The Surgeon-General, Public Health Service, signs an agreement with 37 manufacturers of benzol, under which all shipments will be labeled:—

Benzol—Volatile Solvent-Poison. Use with adequate ventilation. Avoid prolonged breathing of vapor.

All bills of sale are to instruct processors to use the following label where appropriate:—

Caution—Poison—This product contains more than 15% benzol, which is a volatile solvent. Use with adequate ventilation. Avoid prolonged breathing of vapor.

Valuable Data on Coal

"A List of Books and Other Sources of Information Regarding Coal and Coal Products", is the subject of a 63-page booklet compiled by the well-known authority F. R. Wadleigh. Any one interested in the subject of coal or the products derived from it will find this book an invaluable reference work. Copies are available at $1.00 from F. R. Wadleigh, Cecil Apts., 1026-15 st., N.W., Washington.

Fine Chemicals

¶Mercury Slightly Easier as Large Shipment Arrives—Nitrate Lower —Other Revisions—

The price of mercury metal slipped slightly last month. A shipment of 2,000 flasks from abroad during the middle of the month was held responsible for the unsettlement. The highly competitive situation in corrosive sublimate and other items in the mercurial group remains unchanged. Price stability featured the market generally however, the outstanding reductions being a 5c loss in potassium guaiacol sulfonate and a net loss in silver nitrate for the month following a break in the quotation for silver. Business as a whole improved slightly in the 2nd and 3rd weeks of the month but again slumped towards the close. Buyers are now less inclined towards future commitments than they were 30 days ago. There is a good deal of hesitancy on the part of many as to what long-term purchasing policy to employ now that the NRA has been forced out of the picture.

Important Price Changes

ADVANCED

	May 31	Apr. 30
None.		

DECLINED

Mercury	$72.00	$72.50
Potash Guaiacol sulfonate	1.60	1.65
Silver nitrate	.51	.53¾

Now Prentiss Co.

William Benkert & Co. is now known as R. J. Prentiss & Co. and change in no way involves personnel, policies, etc. Offices remain at 100 Gold st., N. Y. City.

New Chemical Supply House

Cole Chemical has just taken over an entire building in Long Island City, N. Y., and will handle a complete line of industrial chemicals, chemical compounds, cleansing materials, and, in addition, a full supply of analytical and reagent laboratory chemicals. David D. Catts is chief chemist; A. W. Nelson is in charge of sales; and Lora Bowker in charge of production. Office and plant is located in the Cole Bldg., Van Dam-Bradley-34th st., Stillwell 4-5340.

Bromine in '34

U. S. '34 bromine production amounted to 15,344,290 lbs., valued at $3,227,425, an increase of 51% in quantity and 58% in value over '33, when 10,147,960 lbs., valued at $2,040,352, were produced. Increase in output was from the Dow-Ethyl plant recently erected at Wilmington, N. C.

Merck's New Building

Building plans are filed by Merck for the construction of a new administration and office building at Rahway.

Location will be on the site of the present plant at the head of Lawrence st. next to the main Lincoln ave. entrance to the plant.

Plans call for a three and four-story fireproof building.

New administration building will release space for additional plant operations made necessary by increased business. Building permit calls for an approximate expenditure of $200,000. General contract has been awarded to Walter Kidde Constructors, Inc., N. Y. City.

Moves

Whittaker, Clark & Daniels moves to 260 W. Broadway, N. Y. City.

Commercial Solvent's Chicago office and warehouse is now located at The Merchandise Mart, Chicago, with the telephone Delaware 4940.

Obituaries

Robert W. Griffith, 55, chemical sales engineer with Champion Fibre of Canton, N. C., on May 21, following a heart attack. He had been ill for a month and was thought to be steadily improving when a 2nd attack caused his death.

Ralph E. Bucknam, Sr., 49, for the past 17 years superintendent of the Langeloth Coal Co., subsidiary of the American Zinc & Chemical Co., on May 21. He had been in ill health for several years.

William C. Kaesche, 36, secretary and a director of Sandoz Chemical, suddenly of a heart attack on May 21.

J. R. Powell, former director of Consolidated Naval Stores, at Lake City, Fla., on May 8.

Thomas G. Harvey, 79, Jakin, Ga., a V.-C. representative at Greensboro, N. C., on May 16.

Robert Hursh, 50, manager of zinc pigment sales for N. J. Zinc, on May 13.

Mrs. F. William Weckman, wife of F. William Weckman, Heyden Chemical treasurer, unexpectedly on May 13 following an operation.

William E. Mitchell, 42, Ciba vice-president and sales manager, on May 2, following an illnesss of a month. He started with the Ciba organization 21 years ago.

Calvin Stitt, 46, formerly head of a color producing and importing firm in Boston of the same name, on Apr. 23, following a long illness.

Thomas C. Meadows, 64, an organizer and for a long period a vice-president of I. A. C., on May 3.

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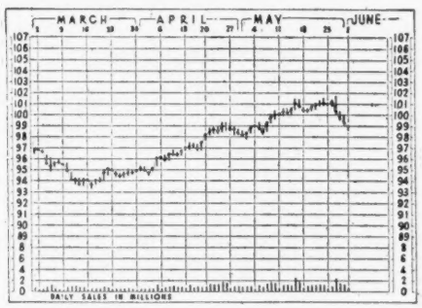
Chemical Finances

¶*Market Makes a Net Gain in May Despite Sharp Decline at the End of the Month as NRA is Doomed*

Value of stocks rose $1,100,414,467 in May. The market value of shares listed on the N. Y. Stock Exchange on June 1 was reported $34,548,762,904.

Trend of the Stock Market.



—N. Y. Herald-Tribune

Some chemical stocks made sharp advances. Market value of the chemical group on June 1 totalled $4,009,492,294 as compared with $4,022,709,791 on May 1. However, the average price rose from $54.31 on May 1 to $55.35 on June 1. The average price on Jan. 1 was $52.10. Earnings statements continue to reflect in most cases further expansion in business.

Penn. Salt Dividend

Penn. Sait directors on June 6 declared a special distribution of $1 a share after receiving reports of satisfactory business.

Cliffs Dow Chemical

Formation of a new Dow subsidiary to be called Cliffs Dow Chemical with an authorized capital stock of $2,500,000 takes the Dow Co. into an entirely new field of chemical manufacture. Statement shows a joint ownership of the stock by Cleveland-Cliffs Iron and Dow and the taking over of the former's Marquette, Mich. plant for the manufacture of wood by-products including alcohol, cellulose products resulting from wood hydrolysis and lignin an important new product.

Statement of the 2 firms follows:

Dow Chemical and Cleveland-Cliffs Iron announce that they have joined in organizing Cliffs-Dow Chemical. New company was incorporated at Lansing with an authorized capital of 25,000 shares of "A" preferred, 10,000 shares of "B" preferred, and 25,000 shares of common. Amount of capital issued at this time was not stated, but it is understood that arrangements have been made to dispose of shares to provide money for further expansion and development. Cleveland-Cliffs Iron has owned and operated a chemical plant at Marquette, Mich., for 30 years.

Scope of the company will be to manufacture chemicals derived from wood, a field in which both companies have been experimenting and carrying on research work. Location at Marquette is considered a very favorable site as it is adjacent to the large timber holdings of the Cleveland-Cliffs Iron.

Board of Directors and Officers

Initial meeting of the board of directors was held May 24, the board elected by the stockholders consisting of Willard Dow, M. E. Putnam, E. W. Bennett, L. I. Doan, and C. J. Strosacker representing Dow; and Wm. G. Mather, E. B. Green, A. C. Brown, and V. P. Geffine, representing Cleveland-Cliffs Iron; and E. T. Olson, present manager of the Cleveland-Cliffs Iron's chemical plant. Officers of Cliffs-Dow Chemical are: Willard Dow, president; E. B. Greene, vice-president; E. W. Bennett, treasurer; V. P. Geffine, secretary, and E. T. Olson, general manager.

Authorized "A" preferred stock has a value of $100 a share while the rest of the stock is listed as non-par. Stock is owned by the 2 firms and none is for sale. It is understood that the local firm holds a controlling interest in the new venture.

Work has already started at Marquette enlarging the alcohol refining plant and remodeling the wood retorts. Some of the products will be made there for the first time and it is expected that the Midland plant will supply some of the chemicals to be used there.

Price Trend of Chemical Company Stocks

	Apr. 30	May 10	May 17	May 24	May 31	Net gain or loss last month	Price on May 31, 1934	1935 High	1935 Low
Air Reduction	120	125	129	136¼	129⅝	+ 9⅝	92¾	136½	104⅜
Allied Chemical	144	147	149⅜	149½	145	+ 1	133	152¾	125
Columbian Carbon	77	82	84¾	89½	83½	+ 6½	65¾	90¾	67
Com. Solvents	19¼	19½	20⅞	20¾	19⅛	— ⅛	22⅜	23⅞	17⅝
du Pont	96¾	98⅝	99⅛	100⅝	97¼	+ ½	84⅝	102½	86⅝
Hercules Powder	75	77½	78⅜	79¾	77	+ 2	65	80	71
Mathieson	28	28¼	29¼	30	28½	+ ½	30⅛	32	23¾
Monsanto	66½	73⅜	74	75⅛	72¼	+ 6	43	77	55
Std. of N. J.	43	45¾	46⅝	49⅜	45¾	+ 2¾	42⅞	50½	35¾
Texas Gulf S.	30⅞	33	35	35¼	33½	+ 2⅜	34½	36¾	28¾
Union Carbide	51½	54⅝	58⅛	60¼	55½	+ 4	39⅝	61	44
U. S. I.	41½	41⅞	42⅞	45⅝	41	— ½	40	46¼	35⅛

Dividends and Dates

Name	Div.	Stock Record	Payable
Abbott Labs.	50c	June 18	July 1
Abbott Labs., ext.	30c	June 18	July 1
Atlas Powder	50c	May 31	July 10
Champion Fibre, 7%	$1.75	June 20	July 1
Coml. Solvents	30c	June 1	June 29
Climax Molybdenum	5c	June 15	June 30
Colgate-Palmolive-Peet	12½c	May 6	June 1
Colgate-Palmolive-Peet, pfd.	$1.50	June 5	July 1
Columbian Carbon.	$1.00	May 17	June 1
Compressed Industrial Gases	50c	May 31	June 15
du Pont, 7%	$1.75	June 20	July 1
du Pont, com.	65c	May 29	June 15
du Pont, deb.	$1.50	July 10	July 25
Heyden Chemical	25c	May 28	June 1
Imperial Chem. Ind.	5½%	Apr. 12	June 8
International Salt.	37½c	June 15	July 1
International Nickel	15c	May 31	June 29
7% pfd.	$1.75	May 31	June 29
7%, $5 par	8¾c	May 31	June 29
Linde Air Products, 6%	$1.50	June 20	July 1
Mathieson Alkali	37½c	June 11	July 1
Mathieson Alkali, pfd.	$1.75	June 11	July 1
Monroe Chem., pfd.	87½c	June 15	July 1
Monsanto Chemical	25c	May 25	June 15
Mutual Chem., 6%	$1.50	June 20	June 28
Mutual Chem., 6%	$1.50	Sept. 19	Sept. 28
Mutual Chem., 6%	$1.50	Dec. 19	Dec. 28
National Lead	$1.25	June 14	June 29
National Lead, A.	$1.75	May 31	June 15
National Lead, B.	$1.50	July 19	Aug. 1
Pacific Borax, pfd.	14c	May 2	May 20
Pittsburgh Plate Glass	50c	June 10	July 1
Penick & Ford	75c	June 1	June 15
Patterson-Sargent	25c	May 15	June 1
Procter & Gamble, 5%	$1.25	May 24	June 15
Sherwin, Williams, pfd.	$1.50	May 15	June 1
Spencer Kellogg	40c	June 15	June 29
Texas Gulf Sulphur	50c	June 1	June 15
United Dyewood, pfd.	$1.75	June 14	July 1
U. S. I.	50c	June 15	July 1
Westvaco Chlorine	10c	May 15	June 1
Worcester Salt	50c	June 20	June 29

Capital Survey of the Industry

A survey made public recently by the A. C. S. Tercentenary Committee shows that 26 companies lead the chemical industry in the U. S. Each has total tangible assets in excess of $1,000,000. Predominant are the "big three," du Pont, Allied Chemical & Dye, and Union Carbide. They represent 65.2% of the industry.

Relative size of the 26 leading companies is shown in the following table prepared for the Tercentenary Committee:

CAPITAL DISTRIBUTION

Total for the Industry	Per cent.
$1.7 billion of tangible assets	100.0
Du Pont (excluding General Motors)	24.7
Allied Chemical aand Dye	22.7
Union Carbide and Carbon	17.8
Total for the "big three"	65.2
American Cyanamid	3.0
Texas Gulf Sulphur	2.9
Hercules Powder	2.2
Air Reduction	2.1
Michigan Alkali	1.9
Atlas Powder	1.8
Freeport Texas	1.4
Monsanto Chemical	1.3
Dow Chemical	1.3
14 smaller chemical companies	16.3

Merger of Swann Approved

At a special meeting of the stockholders of Monsanto, merger of Swann with and into Monsanto Chemical was approved, which merger will become effective on the filing of the necessary

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HYDROCARBON OIL
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Crude, Refined Chipped, Flake and Ball
PHENOL (Natural)
U.S.P. 39.5° M. Pt. and 40° M. Pt.
Technical 39° M. Pt.
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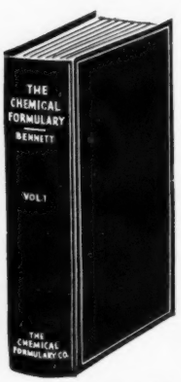

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papers with the Office of the Secretary of State of the State of Delaware, in which State the Companies are incorporated. Prior thereto the board of directors and the stockholders of Swann approved the merger. Merger is on the basis of 1 share of Monsanto stock for each 4½ shares of Swann stock.

Swann and its subsidiaries operate manufacturing plants in Anniston, Alabama, St. Louis, Missouri, and Camden, and are principally engaged in the electrochemical production of phosphoric acid and its derivatives, calcium carbide, ferro phosphorus and abrasives.

Monsanto Plans New Issue

Monsanto Chemical files registration statement with the S. and E. C. seeking to issue $2,000,000 in 2½% convertible notes, dated May 1, '35, due May 1, '45, and 33,333 shares of $10 par common stock to be reserved for conversion at $60 to $100 per share, depending on the conversion date of the notes.

Earnings Statements

Union Carbide reports for the first quarter, ending March 31, net income, after all charges, of $5,293,629.23, equal to 58-81c a share on 9,000,743 shares. First quarter earnings compare with 48.20c a share in the first quarter of '34, and 18.42c a share in the first quarter of '33.

American Commercial Alcohol

American Commercial Alcohol and wholly owned subsidiaries report for the quarter ended Mar. 31: Net profit after interest, depreciation, provision for doubtful accounts, Federal taxes and other charges, $284,125, equal to $1.09 a share on 260,901 $25-par capital shares.

American Cyanamid

Report of American Cyanamid and subsidiaries for quarter ended Mar. 31, subject to audit and year-end adjustments, shows net income of $638,305 after depreciation, depletion, research and process development expense, interest, Federal taxes, minority interest, etc., equivalent to 25c a share (par $10) on combined 2,520,370 shares of Class A and Class B common stock outstanding at end of period, excluding shares held by subsidiaries.

This compares with $479,070 or 19c a share on combined 2,490,373 Class A and B common shares in Mar. quarter of '34.

Climax Molybdenum

Climax Molybdenum reports for 1934 a net income after expenses, depreciation, depletion, interest, reserve for Federal taxes, provisional reserve of $35,000 for employes' welfare fund and other charges, $1,790,603, equal to $2.13 a share on 840,000 shares, compared with $898,550, or $1.07 a share, in '33.

Foreign Chemical Companies

An increase in gross profits from 5.51 million francs in '33 to 5.55 million francs in '34 is reported by the Society of Chemical Industry in Basle. Net profits, however, show a slight drop from 3.36 to 3.33 million francs. Dividend has been maintained at 15% on the share capital of 20 million francs. Balance-sheet figures show little alteration from those at the end of '33.

Report states that total sales by the company dropped during the year by about 6.2%. Dyestuffs' business in particular has suffered owing to the intensive competition in the export markets of Eastern Europe, Asia, and the U. S.

Lautaro Nitrate

Lautaro Nitrate Co., Ltd. (England)—For 1934: Net deficit, £621,625, against balance, including non-recurring items, amounting to £4,816,619 in '33. Balance sheet shows cash of £7,028, against £35,926; accounts receivable, £5,242 against £6,373; inventories of £447,926, against £7,884,035; accounts payable, £84,481, against £617,987.

Monsanto Chemical

Unaudited net operating profits of Monsanto Chemical for the quarter ended Mar. 31 were $757,195 which, after subsidiary preferred dividend requirements, amounts to 85.3c a share on the 864,000 shares outstanding.

Adding Monsanto's proportion of earnings of controlled subsidiaries and including the earnings for the period of Swann, which this past month was acquired by a merger, total net earnings for the quarter were $925,324. This amounts to 96.4c a share on the 959,554 shares which will be outstanding when the exchange of stock occasioned by the merger is completed.

The first quarter earnings for '34 were $674,117 or 78c a share. President Edgar M. Queeny reported operations and sales were at a high level during the quarter and that current sales continue satisfactory.

United Carbon

Eclipsing all previous quarters, including the former high point established in the final quarter of '34, when net earnings equaled $1.18 a share, report of United Carbon Co. and subsidiaries, for the quarter ended Mar. 31, shows net profit of $477,633 after depreciation, depletion and Federal taxes. On 394,327 no-par shares of capital stock, the net is equal to $1.21 a share.

This compares with net profit in first quarter of '34, of $309,863, equal after dividends paid on the 7% preferred stock then outstanding to 76c a share on 370,127 shares of common.

United Chemicals

Report of United Chemicals, Inc., and subsidiaries for quarter ended Mar. 31, shows net loss of $14,102 after depreciation, taxes, etc., comparing with net loss of $15,346 in preceding quarter and net loss of $24,102 in March quarter of previous year.

Current assets as of Mar. 31, amounted to $1,292,185 and current liabilities were $117,273 comparing with $1,210,262 and $126,801 respectively on Mar. 31, '34.

Two Reports on Profits

Standard Statistics reports net earnings of 22 leading chemical companies in '34 totalled $108,497,000, against $87,895,000 in '33.

Federal Reserve Bank of N. Y. reports following comparison in earnings of 27 chemical and drug companies.

(Net profits in millions of dollars)

1929	202.3
1931	125.7
1932	71.8
1933	100.4
1934	124.1

"Over-the-Counter"

	May 31	April 30
American Hard Rubber	8½-11½	4-6½
Merck	25-27	26-28
Merck, pfd.	117½-119	117-119½
Worcester Salt	.....	50
J. S. Young	105-112	100
J. S. Young, pfd.	109½	108

Foreign Markets

	May 31	April 30
British Celanese	11s.9d.	9s. 6d.
Celanese	£4⅝	£4¼
Courtaulds	57s.3d.	52s.3d.
I. C. I.	35s.	35s.
Unilever	30s.3d	27s.6d.
PARIS		
Air Liquide	870	790 (francs)
BERLIN		
I. G.	151	138 (marks)*
MILAN		
Montecatini	180	174 (lire)

* Extra dividend.

Earnings Statements Summarized

Company:	Annual dividends	Net income 1935	Net income 1934	Common share earnings 1935	Common share earnings 1934	Surplus after dividends 1935	Surplus after dividends 1934
Am. Commercial Alcohol Corp.:							
March 31 quarter	*f*....	$284,125	.....	$1.09	....	.....	.....
Continental-Diamond Fibre Co.:							
March 31 quarter	*z*$ .15	15,214	†$70,202	.03	....	.....	.....
United Carbon Co.:							
March 31 quarter	2.40	477,633	309,863	*h*1.21	$ .76	*.....	*.....
United Chemicals, Inc.:							
March 31 quarter	*f*....	†14,102	†24,102	....	....	.....	.....

f No common dividend; *z* Last dividend declared; † Net loss; *h* On shares outstanding at close of respective periods; * Not available.

Chemical Stocks and Bonds

1935 Last	1935 May High	1935 May Low	1934 High	1934 Low	1933 High	1933 Low	Sales	Stocks	Par $	Shares Listed	An. Rate*	Earnings $-per share-$ 1934	Earnings $-per share-$ 1933
							Number of shares						
NEW YORK STOCK EXCHANGE							May 1935	1935					
129⅝	136½	104⅜	113	91¾	112	47½	24,400	64,100	Air Reduction	No	841,288	$4.50	4.98	3.79
145	152¾	125	160¾	115⅛	152	70¾	32,600	99,800	Allied Chem. & Dye	No	2,214,099	6.00	6.83	5.50
126	127½	122½	130	122⅜	125	115	5,500	13,800	7% cum. pf.	100	345,540	7.00	50.79	42.24
42	57¾	42	48	25¼	35	7¼	6,900	60,400	Amer. Agric. Chem.	100	315,701	2.00	.....	*p*4.19
22⅞	33¼	22½	62½	20¾	89⅞	13	22,300	95,700	Amer. Com. Alcohol	20	260,716	None	.....	4.56
39¾	42¾	36	39⅛	26¼	29¼	9¾	11,300	41,700	Archer-Dan-Midland	No	541,546	1.50	.....	*p*3.82
37⅞	44½	32¾	55½	35¼	39½	9	24,400	50,000	Atlas Powder Co.	No	234,235	2.00	2.49	.74
111¼	112	106¾	106¾	83	83⅛	60	1,020	3,430	6% cum. pfd.	100	88,781	6.00	13.54	8.38
21	35⅜	19½	44⅞	17⅛	58⅞	4½	77,800	323,200	Celanese Corp. Amer.	No	987,800	None	1.25	3.32
15½	18¼	15⅜	18⅛	9⅜	22⅜	7	33,300	156,500	Colgate-Palm.-Peet	No	1,985,812	.75	1.16	— .57
104⅜	105½	101	102½	68½	88	49	1,700	11,100	6% pfd.	100	254,500	6.00	15.14	1.51
83½	90¾	67	77¼	58	71½	23⅛	27,900	98,600	Columbian Carbon	No	538,154	3.40	3.93	2.17
19⅛	23⅞	17⅝	36¾	15¾	57¼	9	109,500	553,000	Commer. Solvents	No	2,635,371	.85	.89	.88
69⅜	74⅞	62	84½	55½	90⅝	45⅜	41,600	122,100	Corn Products	25	2,530,000	3.00	3.16	3.87
164	165	149	150½	135	145¾	117½	600	4,100	7% cum. pfd.	100	243,739	7.00	39.65	46.02
43½	50⅜	36	55¼	29	33⅞	10	2,400	7,500	Devoe & Rayn. A	No	95,000	2.00	2.36	3.82
97¼	102½	86⅝	103⅞	80	95⅞	32⅛	103,500	371,000	DuPont de Nemours	20	10,871,997	3.15	3.63	2.93
128½	131	126⅞	128½	115	117	97½	2,300	15,200	6% cum. deb.	100	1,092,699	6.00	42.73	35.58
139½	149¼	110½	116½	79	89¾	46	20,100	100,000	Eastman Kodak	No	2,250,921	4.00	6.28	4.76
155	155	141	147	120	130	110	720	3,240	6% cum. pfd.	100	61,657	6.00	235.22	180.34
25⅝	28½	17¼	50⅜	21½	49⅜	16⅛	46,900	112,600	Freeport Texas	10	784,664	2.00	1.76	3.01
115½	120⅛	114	160⅛	113½	160⅛	97	100	1,200	6% conv. pfd.	100	25,000	6.00	120.08	156.73
27⅛	29	23⅜	28⅜	15⅝	20	3¼	24,500	93,600	Glidden Co.	No	603,304	.90	.....	1.54
108	109¼	104⅞	107½	83	91½	48	930	3,420	Glidden, 6% pfd.	100	63,044	7.00	.....	22.60
99½	103¾	85	96⅞	74	85⅞	65	7,800	26,000	Hazel Atlas	25	434,409	5.00	5.21	6.22
77	80	71	81⅝	59	68⅝	15	8,500	26,100	Hercules Powder	No	582,679	3.00	3.94	2.79
127	128	122	125¾	111	110⅛	85	460	2,020	7% cum. pfd.	100	105,765	7.00	28.79	22.38
25⅛	33	23½	32	19⅜	85	24	36,000	219,700	Industrial Rayon	No	600,000	1.68	2.23	3.01
3⅛	5	2¾	6⅛	2	5⅞	⅞	4,000	43,700	Intern. Agricul.	No	436,049	None	.....	*p* .69
28	42¾	31	37¼	15	23½	5	1,800	17,500	7% cum. pr. pfd.	100	100,000	None	.....	*p*4.00
27⅝	29⅜	22¼	29¼	21	23¼	6¾	203,300	741,500	Intern. Nickel	No	14,584,025	.60	1.14	.53
33½	36¼	29	32	21	27¾	13¾	2,700	9,400	Intern. Salt	No	240,000	1.50	2.02	2.04
33¾	36¼	32	33⅛	15¾	22	7½	4,500	21,900	Kellogg (Spencer)	No	500,000	1.60	.....	*v*3.01
27⅜	32¾	21½	43⅞	22½	37⅛	4⅜	70,600	286,400	Libbey Owens Ford	No	2,559,042	1.20	1.25	1.64
29⅛	31⅞	24½	35⅜	16⅛	50	10¼	22,700	74,000	Liquid Carbonic	No	342,406	1.25	.....	*v*1.05
28½	32	23¾	40¾	23½	46⅝	14	23,500	108,200	Mathieson Alkali	No	650,436	1.50	1.20	1.70
72¼	77	55	61⅜	39	83	25	13,300	68,800	Monsanto Chem.	10	864,000	1.25	3.03	2.57
170	175¼	145	170	135	140	43¼	2,900	8,600	National Lead	100	309,831	5.00	8.38	6.98
158½	162½	150	146½	122	128¼	101	300	1,940	7% cum. "A" pfd	100	243,676	7.00	20.12	18.35
136	136	121⅝	121½	100½	109⅛	75	570	1,610	6% cum. "B" pfd.	100	103,277	6.00	35.36	30.45
6	8	4⅜	13	5½	11¾	1⅜	8,400	38,100	Newport Industries	1	519,347	None	.31	.05
95	95¾	80	94	60	96¾	31½	15,600	57,300	Owens-Illinois Glass	25	1,200,000	4.00	5.41	4.86
48¼	50	42⅜	44⅜	33⅜	47½	19⅝	34,100	161,700	Procter & Gamble	No	6,410,000	1.70	.....	*p* 2.11
120	120¾	115	117	102½	110¾	97	590	3,010	5% pfd. (ser. 2-1-29)	100	171,569	5.00	.....	*p*73.15
4⅝	5½	4	6¾	3⅛	7¼	1⅜	10,200	44,100	Tenn. Corp.	5	857,896	None	.27	— .11
33½	36¾	28¾	43¼	30	45¼	15¼	54,900	198,500	Texas Gulf Sulphur	No	2,540,000	2.00	1.81	2.93
55½	61	44	50⅞	35⅞	51⅞	19¾	145,900	475,300	Union Carbide & Carbon	No	9,000,743	1.60	2.28	1.59
54½	60⅛	46	50⅜	35	37¾	10¼	35,900	111,100	United Carbon	No	370,127	2.40	3.55	1.39
41	46¼	35⅛	64¾	32	94	13½	33,300	106,300	U. S. Indus. Alco.	No	391,033	None	4.04	3.56
12½	21¾	11¼	31¾	14	36¼	7⅝	24,000	105,100	Vanadium Corp.-Amer.	No	366,637	None	—2.29	—2.40
3	4⅝	2½	5⅜	1⅞	7⅜	⅝	5,400	45,200	Virginia-Caro. Chem.	No	486,000	None	.....	*p*—2.46
18⅛	27¼	18	26	10	26½	3⅜	9,500	67,700	6% cum. part. pfd.	100	213,392	None	.....	*p* .52
96	101	85	84	59¾	63½	35⅜	800	4,100	7% cum. prior pfd.	100	60,000	None	.....	*p*9.06
18	23½	16¾	27¼	14⅞	20½	5	5,100	26,300	Westvaco Chlorine	No	284,962	.40	1.55	1.08
NEW YORK CURB EXCHANGE														
18⅝	20⅝	15	22½	14⅝	16½	3¼	105,400	277,200	Amer. Cyanamid "B"	No	2,404,194	*m* .10	.99	.99
2¾	3⅛	2	4⅛	2⅜	4½	1	400	4,000	British Celanese Am. R.	243	.....	None	.....	.....
101	110	90	105¼	81	110	27	1,375	12,875	Celanese, 7% cum. 1st pfd.	100	144,379	7.00	16.37	32.24
104½	105	97½	102	83	90	51	300	3,075	7% cum. prior pfd.	100	113,668	7.00	28.13	47.98
8¼	15	8	19	7	26⅞	2	600	4,575	Celluloid Corp.	15	194,952	None	—1.67	—1.00
12½	12½	11⅝	14⅜	10½	11⅝	4⅛	800	6,400	Courtaulds' Ltd.	1 £	24,000,000	4½%	.....	.....
95¾	102½	80½	91	67½	78	30	7,900	33,400	Dow Chemical	No	945,000	2.00	.....	†3.60
9½	12½	8¾	10¾	4	8	½	13,200	23,400	Duval Texas Sulphur	No	500,000	None	.....	*z* .08
48	52	37	40¾	19	19	8	2,500	10,700	Heyden Chem. Corp.	10	147,600	1.35	3.07	2.74
60½	64⅝	46¾	57½	39	39⅞	13	22,100	55,100	Pittsburgh Plate Glass	25	2,141,305	1.40	2.69	1.87
97½	99	84	90½	47¼	47	12⅞	9,000	47,300	Sherwin Williams	25	635,583	3.00	.....	*y*3.54
108⅞	113½	108	109¾	100	99	80	200	2,420	6% pfd. AA. cum.	100	155,521	6.00	.....	*y*20.78
PHILADELPHIA STOCK EXCHANGE														
85	85	70	75	50¼	57	25¼	630	1,984	Pennsylvania Salt	50	150,000	3.00	.....	*p*5.07

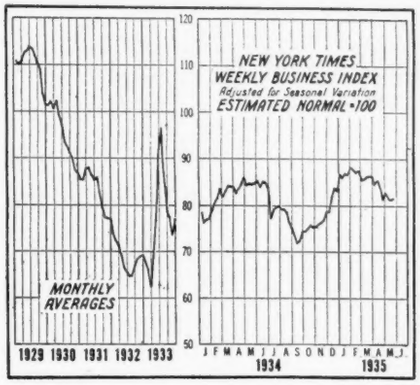
1935 Last	1935 May High	1935 May Low	1934 High	1934 Low	1933 High	1933 Low	Sales	Bonds	Date Due	Int. %	Int. Period	Out-standing $
NEW YORK STOCK EXCHANGE							May 1935	1935				
108¾	109¼	104½	106¾	83⅞	89	64	461,000	2,324,000	Amer. I. G. Chem. Conv. 5½'s	1949	5½	M. N.	29,929,000
10½	11	7⅜	17¾	5	14⅛	2⅛	98,000	507,000	Anglo Chilean s. f. deb. 7's	1945	7	M. N.	12,700,000
83	87½	77⅜	88	61½	74⅞	37	65,000	355,000	By-Products Coke Corp. 1st 5½'s "A"	1945	5½	M. N.	4,932,000
97⅝	99¾	91⅛	92	62	65	38½	193,000	938,000	Int. Agric. Corp. 1st Coll. tr. stpd. to 1942	1942	5	M. N.	5,994,100
9¼	10⅜	7	19½	5⅛	14⅞	2½	491,000	1,881,000	Lautaro Nitrate conv. b's	1954	6	J. J.	31,357,000
90½	94	89	98½	89⅞	99⅞	87	64,000	338,000	Montecatini Min & Agric. det. 7's with war.	1937	7	J. J.	7,075,045
36	38	35	74½	34½	62	33¾	.....	13,000	Ruhr Chem. 6's	1948	6	A. O.	3,156,000
101	102	91½	90	65½	76	50	79,000	153,000	Tenn. Corp. deb. 6's "B"	1944	6	M. S.	3,007,900
80	94¼	66	89½	62	81	34¾	157,000	1,043,000	Vanadium Corp. conv. 5's	1941	5	A. O.	4,261,000
NEW YORK CURB EXCHANGE													
101¼	104	101¼	104⅝	101⅜	103½	101	2,000	62,000	Westvaco Chlorine Prod. 5½'s	1937	5½	M. S.	1,393,000

† Year ended 5-31-34; *m* Last paid, no regular rate; *p* Year ended 6-30-34; *v* Year ended 9-1-34; *y* Year ended 8-31-34; *z* Year ended 8-31-34; * Including extras.

Industrial Trends

¶Despite Legislative Uncertainties Business Holds Up Well — Leaders Seek Means of Retaining Favorable Portions of the NRA—

Volume of business in May continued favorable although there were some seasonal declines, particularly in the so-


NEW YORK TIMES
WEEKLY BUSINESS INDEX
Adjusted for Seasonal Variation
ESTIMATED NORMAL=100
MONTHLY AVERAGES
1929 1930 1931 1932 1933
J F M A M J J A S O N D J F M A M J
1934
1935

The "ups and downs" in the trend of business are graphically shown and compared with previous years.

called heavy industries. Retail trade was speeded up in many lines by the advent of warmer weather in several sections of the country. Some slackening in the pace was naturally reported in the final few days of the month following the telling blow dealt the entire New Deal structure and the NRA in particular by the decision of the Supreme Court. Uncertainty prevails at the time of this writing as to whether the Administration will make any effort to revive the "Blue Eagle" in some modified form, or will permit it to expire on June 16. Many of the other alphabetically designated recovery agencies, including the AAA, are possibly in the same or very similar category as the discredited NRA, and until the situation in Washington clarifies there is bound to be some, in fact a great deal, of hesitancy on the part of business.

The first effect of the decision was a break in both stock market prices and most commodity prices. This was accentuated further by the now famous press conference of the President, a talk which has been characterized even by many staunch Administration supporters as having been imprudent and unwise. It is a question now of whether prices generally will again be deflated, and if they do, what action if any of an inflationary character will be taken to offset this.

Steel Activity Lower

Steel mill activity shows a decline. On May 27 the American Iron and Steel Institute reported the rate at 42.3% compared with 43.1% at the end of April and 56.1% a year ago. Electric production while showing a gradual seasonal recession is still holding above last year's figures. Carloadings, on the other hand, are not as encouraging and the totals are running below the corresponding periods of a year ago. Despite a slight pick-up in cotton cloth production last month and a fairly good rate of production in the rayon field the textile industry is far from normal and the outlook is not promising. Some industries, notably the paint field, expanded operations in May. Production in the glass, rubber, paper, and tanning fields remained fairly constant at or near April levels. Despite the strike at the Toledo automobile accessory plants early in the month, the total production of cars was close to the anticipated figures. If the strike had lasted a week longer, however, many of the Detroit assembly lines would have had to shut down. A curtailment in volume is now looked for in the next 3 months. What happens after that depends upon the state of mind and general business conditions prevailing.

The *N. Y. Times* Index of Business Conditions or Activity stood at 81.6 on May 25 compared with 81.3 on Apr. 27 of this year and 84.7 at the end of May a year ago. Fisher's Index of purchasing power declined from 122.2 on Apr. 27 to 121.5 on June 1, while his index of prices rose from 81.8 to 82.3 on June 1.

Shipments of chemicals into most consuming channels were in good volume in May, although the total fell considerably below the totals reached in March and April. A decided decline was reported in the last week of the month and was attributed to the decision on the NRA and also the holiday coming close to the end-of-the-month period.

Price changes were relatively few last month. Many of the existing contracts are up for review at the close of June and buyers and sellers are wondering what effect the NRA decision will have if any. Both evinced more than passing interest in the suggestion of Mathieson Alkali's president, E. M. Allen, of contracts for '36 calling for monthly reviews of prices.

Seasonal items are moving out in satisfactory quantities and there is a good demand for most of the insecticide and fungicide materials. Calcium chloride tonnages promise to be large, and in the fine chemicals division a much improved demand is reported for citric and tartaric acids. Aside from items of this character, however, further contraction in demand is now looked for over the next 60-90 days—the usual so-called "summer dullness."

Statistics of Business

	April 1935	April 1934	March 1935	March 1934	February 1935	February 1934
Automotive production	447,546	371,338	451,805	345,443	304,544	231,707
Bldg. contracts*‡	$124,000	$131,157	$123,043	$179,161	$75,083	$96,716
Failures, Dun & Bradstreet	1,115	1,052	976	1,102	1,005	1,049
Merchandise imports‡	.....	$146,517	$177,279	$158.105	$152,288	$125,047
Merchandise exports‡	.....	$179,444	$185,001	$190,890	$160,312	$159,595
Newsprint Production						
Canada, tons	222,244	216,508	205,682	211,317	180,305	174,447
U. S., tons	74,891	83,652	73,528	84,966	70,805	72,402
Plate glass prod., sq. ft. ...	.....	.....	.....	9,926,859	13,723,151	7,441,278
Steel ingots production ...	2,606,311	2,897,808	2,830,700	2,761,438	2,742,125	2,183,160
Steel activity, % capacity	45.28	52.64	49.18	46.45	51 61	41.31
Pig iron production	1,663,475	1,726,851	1,770,000	1,619,534	1,608,552	1,263,673
U. S. consumption, crude rubber, tons	.....	.....	42,620	47,097	43,187	40,609
Tire shipments	.....	.....	4,204,131	4,222,962	.....	3,285,013
Tire production	.....	.....	4,345,581	5,180,122	.....	4,335,092
Tire inventory	.....	.....	11,675,268	11,650,661	.....	10,725,032
Dept. of Labor Indices						
Factory payrolls, totals†..	70.7	67.3	70.8	64.8	69.1	60.6
Factory employment† ...	82.4	82.3	82.4	80.8	81.2	78.4
Chemical price index† ...	.....	78.6	88.1	79.0	86.5	78.8
Chemical employment†a ..	.....	110.8	113.9	113.4	109.9	104.8
Chemical payrolls†a	.....	95.8	96.0	88.3	92.5	87.2
Chemicals and Related Products						
Exports‡	.....	$7,840	$9,077	$8,848	$7,203	$6,676
Imports‡	.....	$8,509	$6,099	$7,366	$6,953	$4,230
Stocks, mfd. goods†	.....	123	118	126	122	129
Stocks, raw materials† ..	.....	96	91	101	98	108

Week Ending	Carloadings 1935	Carloadings 1934	Carloadings % of Change	Electrical Output§ 1935	Electrical Output§ 1934	Electrical Output§ % of Change	Jour. of Com. Price Index	National Fertilizer Association Indices: Metals	Fats & Oils	Chem. & Drugs	Mixed Fert.	Fert. Mat.	All Groups	Labor Dept. Chem. & Drug Price Index	% Steel Activity	N. Y. Times Index Bus. Act.
Apr. 27....	558,886	609,704	—8.3	1,673,295	1,668,564	+0.3	79.7	82.5	78.2	94.4	76.0	65.3	78.3	80.8	43.1	81.3
May 4....	569,065	605,246	....	1,698,178	1,632,766	+4.0	79.3	82.3	72.3	94.4	76.0	65.3	78.1	80.8	42.2	81.2
May 11....	575,185	602,798	—4.6	1,701,702	1,643,433	+3.5	80.1	82.4	71.2	94.4	76.0	65.2	78.3	80.7	43.4	81.1
May 18....	583,327	612,331	....	1,700,022	1,649,770	+3.0	80.0	82.7	70.5	94.4	76.3	65.3	78.3	80.8	42.8	81.3
May 25....	599,543	625,990	—4.4	.....	.....	....	79.8	83.0	70.8	94.4	76.3	65.3	78.4	...	...	81.6

* 37 states, F. W. Dodge Corp.; ‡ 000 omitted; † Dept. of Labor, 3 year average, 1923-1925 = 100.0; *a* Includes all allied products but not petroleum refining; § k.w.h., 000 omitted.

Prices Current

Heavy Chemicals, Coal-tar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizers and Insecticide Materials, Petroleum Solvents and Chemicals, Naval Stores, Fats and Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Import chemicals are so designated. Resale stocks when a market factor are quoted in addition to maker's prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f.o.b., or ex-dock. Materials sold f.o.b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1934 Average $1.31. - Jan. 1935 $1.23 - May 1935 $1.24

	Current Market	1935 Low	1935 High	1934 Low	1934 High
Acetaldehyde, drs c-l, wks lb.	...	.14	...	.14	.16½
Acetaldol, 95%, 50 gal drs wks .....lb.	.21	.25	.21	.25	.21	.31
Acetamide, tech, lcl, kegs..lb.	.38	.43	.38	.43	.40	1.35
Acetanalid, tech, 150 lb bbls lb.	.24	.26	.24	.26	.24	.26
Acetic Anhydride, 100 lb cbys .....lb.	.21	.25	.21	.25	.21	.25
Acetin, tech, drs .....lb.	.22	.24	.22	.24	.22	.32
Acetone, tks, delv .....lb.	.11	.12	.11	.12	.10	.12
drs, c-l, delv .....lb.	...	.12	..	.12	.12	.12
Acetyl chloride, 100 lb cbys lb.	.55	.68	.55	.68	.55	.68
ACIDS						
Abietic, kgs, bbls .....lb.	.06¾	.07	.06¾	.07	.06	.07
Acetic, 28%, 400 lb bbls, c-l, wks .....100 lbs.	...	2.45	2.40	2.45	2.40	2.91
glacial, bbls, c-l, wks 100 lbs.	...	8.43	8.25	8.43	8.25	10.02
glacial, USP, bbls, c-l, wks .....100 lbs.	...	12.43	12.25	12.43	...	12.25
Adipic, kgs, bbls .....lb.	...	.72	...	.72	.72	.72
Anthranilic, refd, bbls ....lb.	.85	.95	.85	.95	.85	.95
tech, bbls .....lb.	...	.75	...	.75	.65	.75
Battery, cbys, delv ..100 lbs.	1.60	2.25	1.60	2.25	1.60	2.25
Benzoic, tech, 100 lb kgs ..lb.	.40	.45	.40	.45	.40	.45
USP, 100 lb kgs .....lb.	.54	.59	.54	.59	...	...
Boric, tech, gran, 80 tons, bgs, delv .....ton *a*	...	80.00	...	80.00	80.00	80.00
Broenner's, bbls .....lb.	1.20	1.25	1.20	1.25	1.20	1.25
Butyric, 95%, cbys .....lb.	.53	.60	.53	.60	.53	.85
edible, c-l, wks, cbys ...lb.	1.20	1.30	1.20	1.30	1.20	1.30
synthetic, c-l, drs .....lb.	...	.22	...	.22	.22	.22
wks .....lb.	...	.23	...	.23	.23	.23
tks, wks .....lb.	...	.21	...	.21	.21	.21
Camphoric, drs .....lb.	...	5.25	...	5.25	5.25	5.25
Chicago, bbls. .....lb.	...	2.10	...	2.10	2.10	2.10
Chlorosulfonic, 1500 lb drs, wks .....lb.	.04½	.05½	.04½	.05½	.04½	.05½
Chromic, 99¾%, drs, delv lb.	.13¾	.15¾	.13¾	.15¾	.13½	.15¾
Citric, USP, crys, 230 lb bbls .....lb. *b*	.28	.29	.28	.29	.28	.30
anhyd, gran, drs .....lb. *b*	...	.31	...	.31	.31	.31
Cleve's, 250 lb bbls .....lb.	.52	.54	.52	.54	.52	.54
Creaylic, 99%, straw, HB, drs, wks, frt equal ..gal.	.46	.47	.46	.47	.46	.47
99%, straw, LB, drs, wks, frt equal .....gal.	.64	.65	.64	.65	.64	.65
resin grade, drs, wks, frt equal .....gal.	.54	.55	.54	.55	.54	.55
Crotonic, drs .....lb.	.90	1.00	.90	1.00	.90	1.00
Formic, tech, 140 lb drs ..lb.	.11	.13	.11	.13	.11	.13
Fumaric, bbls .....lb.	...	.60	...	.60	...	...
Fuming, see Sulfuric (Oleum)						
Fuoric, tech, 90%, 100 lb. drs. .....lb.	...	.35	...	.35	...	.35
Gallic, tech, bbls .....lb.	.65	.68	.65	.68	.60	.70
USP, bbls .....lb.	.70	.80	.70	.80	.74	.80
Gamma, 225 lb bbls, wks...lb.	.77	.79	.77	.79	.77	.79
H, 225 lb. bbls, wks .....lb.	.50	.55	.50	.55	.50	.70
Hydriodic, USP, 10% sol. cbys .....lb.	.50	.51	.50	.51	.50	.51
Hydrobromic, 48% com 155 lb cbys, wks .....lb.	.45	.48	.45	.48	.45	.48
Hydrochloric, see muriatic.						
Hydrocyanic, cyl, wks ....lb.	.80	1.30	.80	1.30	.80	1.30
Hydrofluoric, 30%, 400 lb bbls, wks .....lb.	.07	.07½	.07	.07½	.07	.07½
Hydrofluosilicic, 35%, 400 bbls, wks .....lb.	.11	.12	.11	.12	.11	.12
Lactic, 22%, dark, 500 lb bbls .....lb.	.04½	.05	.04½	.05	.04	.05
22%, light refd, bbls ..lb.	.06½	.07	.06½	.07	.06½	.07
44%, light, 500 lb bbls ..lb.	.11½	.12	.11½	.12	.11½	.12
44%, dark, 500 lb bbls ..lb.	.09½	.10	.09½	.10	.09	.10
USP X, 95%, cbys ....lb.	.45	.50	.45	.50	...	...
USP VIII, 75%, cbys ..lb.	.43	.48	.43	.48	...	...
Laurent's, 250 lb bbls ....lb.	.36	.37	.36	.37	.36	.37
Linoleic, bbls .....lb.	.16	.16	.16	.16	.16	.16
Maleic, powd, kgs .....lb.	.29	.32	.29	.32	.25	.32
Malic, powd, kgs .....lb.	.45	.60	.45	.60	.45	.60
Metanillic, 250 lb bbls ....lb.	.60	.65	.60	.65	.60	.65
Mixed, tks, wks .....N unit	.06½	.07¼	.06½	.07¼	.06½	.07¼
S unit	.008	.009	.008	.009	.008	.01
Monochloracetic, tech, bbls lb.	.16	.18	.16	.18	.16	.18
Monosulfonic, bbls .....lb.	1.50	1.60	1.50	1.60	1.50	1.60
Muriatic, 18°, 120 lb cbys, c-l, wks .....100 lb.	...	1.35	...	1.35	...	1.35
tks, wks .....100 lb.	...	1.00	...	1.00	...	1.00
20°, cbys, c-l, wks ..100 lb.	...	1.45	...	1.45	...	1.45
tks, wks .....100 lb.	...	1.20	...	1.20	...	1.20
22°, c-l, cbys, wks ..100 lb.	...	1.95	...	1.95	...	1.95
tks, wks .....100 lb.	...	1.60	...	1.60	...	1.60
CP, cbys .....lb.	.06½	.07½	.06½	.07½	.06½	.07½
N & W, 250 lb bbls .....lb.	.85	.87	.85	.87	.85	.87
Naphthenic, drs .....lb.	.12	.13	.12	.13	.10	.13
Naphthionic, tech, 250 lb bbls .....lb.	.60	.65	.60	.65	.60	.65
Nitric, 36°, 135 lb cbys, c-l, wks .....100 lb. *c*	...	5.00	...	5.00	...	5.00
38°, c-l, cbys, wks..100 lb. *c*	...	5.50	...	5.50	...	5.50
40°, cbys, c-l, wks..100 lb. *c*	...	6.00	...	6.00	...	6.00
42°, c-l, cbys, wks..100 lb. *c*	...	6.50	...	6.50	...	6.50
CP, cbys, delv .....lb.	.11½	.12½	.11½	.12½	.11½	.12½
Oxalic, 300 lb bbls, wks, or N. Y. .....lb.	.11½	.12½	.11½	.12½	.11½	.12½
Phosphoric, 50%, USP, cbys .....lb.	.14	.14	.14	.14	.14	.14
50%, acid, c-l, drs, wks..lb.	.06	.08	.06	.08	.05	.08
75%, acid, c-l, drs, wks..lb.	.09	.10½	.09	.10½	.07	.10½
Picramic, 300 lb bbls, wks.lb.	.65	.70	.65	.70	.65	.70
Picric, kgs, wks .....lb.	.30	.40	.30	.40	.30	.50
Propionic, 98% wks, drs..lb.	...	.35	...	.35	...	...
80% .....lb.	.15	.17½	.15	.17½	...	...
Pyrogallic, crys, kgs, wks..lb.	1.55	1.65	1.55	1.65	1.40	1.65
Salicylic, tech, 125 lb bbls, wks .....lb.	...	.40	...	.40	.33	.40
Sebacic, tech, drs, wks ....lb.	...	.58	...	.58	...	.58
Succinc, bbls .....lb.	...	.75	...	.75	...	...
Sulfanilic, 250 lb bbls, wks lb.	.18	.19	.18	.19	.18	.19
Sulfuric, 60°, tks, wks ..ton	...	11.00	...	11.00	...	11.00
c-l, cbys, wks ....100 lb.	...	1.10	...	1.10	...	1.10
66°, tks, wks .....ton	...	15.50	...	15.50	15.00	15.50
c-l, cbys, wks ....100 lb.	...	1.35	...	1.35	...	1.35
CP, cbys, wks .....lb.	.06½	.07½	.06½	.07½	.06½	.07½
Fuming (Oleum) 20% tks, wks .....ton	...	18.50	...	18.50	...	18.50
Tannic, tech, 300 lb bbls...lb.	.23	.40	.23	.40	.23	.40
Tartaric, USP, gran powd, 300 lb bbls .....lb.	...	.24	.24	.25	.25	.26
Tobias, 250 lb bbls.....lb.	.75	.80	.75	.80	.75	.80
Trichloroacetic bottles.....lb.	2.45	2.75	2.45	2.75	2.00	2.75
kgs .....lb.	...	1.75	...	1.75	...	1.75
Tungstic, tech, bbls .....lb.	1.50	1.60	1.50	1.60	1.35	1.70
Vanadic, drs, wks .....lb.	1.10	1.20	1.10	1.20	1.10	1.20
Albumen, light flake, 225 lb bbls .....lb.	.45	.53	.45	.53	.35	.53
dark, bbls .....lb.	.12	.17	.12	.17	.10	.17
egg, edible .....lb.	...	1.05	.85	1.05	.82	.92
vegetable, edible .....lb.	.65	.70	.65	.70	.65	.70
ALCOHOLS						
Alcohol, Amyl, tks, delv...lb.	...	.143	...	.143	...	.143
c-l, drs, delv .....lb.	...	.15	...	.15	.15	.157
Amyl, secondary, tks, delv .....lb.	...	.108	...	.108	...	.108
c-l, drs, delv .....lb.	...	.118	...	.118	...	.118
Amyl, tertiary, tks, delv lb.	...	.052	.052	.072	...	.052
c-l, drs, delv .....lb.	...	.062	.062	.082	...	.062
Benzyl, bottles .....lb.	.65	1.10	.65	1.10	.75	1.10
Butyl, normal, tks, delv .lb. *d*	...	.12	...	.12	.09½	.12
c-l, drs, delv .....lb. *d*	...	.13	...	.13	.10½	.13
Butyl, secondary, tks, delv .....lb. *d*	...	.096	...	.096	.076	.096
c-l, drs, delv .....lb. *d*	...	.106	...	.106	.086	1.06
Capryl, drs, tech, wks ..lb.	...	.85	...	.85	.85	.85
Cinnamic, bottles .....lb.	3.25	3.65	3.25	3.65	3.25	3.65
Denatured, No. 5, c-l, drs, wks .....gal. *e*	...	.35½	.34	.35½	.30	.34
Western schedule, c-l, wks .....gal. *e*	...	.39½	.38	.39½	...	...
Denatured, No. 1, tks, wks .....gal. *e*	...	.31	.29½	.31	.29½	.304
c-l, drs, wks .....gal. *e*	...	.36	.34½	.36	...	...
Western schedule, tks, wks .....gal. *e*	...	.35	.32½	.35	...	...
c-l, drs, wks .....gal. *e*	...	.40	.37½	.40	...	...
Diacetone, tech, tks, delv .....lb. *f*	...	.16	...	.16	...	...
c-l, drs, delv .....lb. *f*	...	.17	...	.17	...	.17

a Powdered boric acid $5 a ton higher in each case; USP $15 higher; *b* Powdered citric is ½c higher; kegs are in each case ½c higher than bbls.

c Yellow grades 25c per 100 lbs. less in each case; *d* Spot prices are 1c higher; *e* Anhydrous is 5c higher in each case; *f* Pure prices are 1c higher in each case.

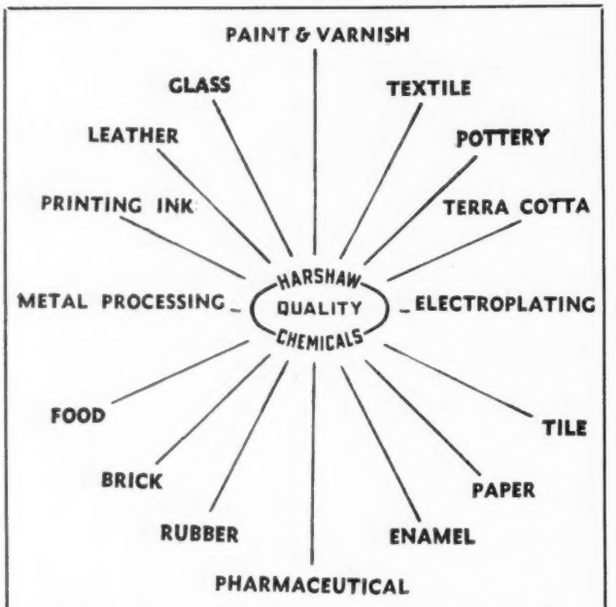
ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

		Current Market		1935 Low	1935 High	1934 Low	1934 High
Alcohols (continued)							
Ethyl, 190 proof, molasses, tks	gal. *g*	...	4.10	4.08½	4.10	...	4.08½
c-l, drs	gal. *g*	4.17	4.27	4.13½	4.27	...	4.13½
c-l, bbls	gal. *g*	4.18	4.28	4.15½	4.28	4.12½	4.24½
absolute, drs	gal. *g*	4.57½	6.11½	4.55½	6.11½	...	...
Furfuryl, tech, 500 lb, drs	lb.	...	.35	...	.35	.35	.40
Hexyl, secondary tks, delv	lb.	...	.11½	...	.11½	...	.11½
c-l, drs, delv	lb.	...	.12½	...	.12½	...	.12½
Normal, drs, wks	lb.	3.25	3.50	3.25	3.50	3.25	3.50
Isoamyl, prim, cans, wks	lb.	4.00	4.50	4.00	4.50	4.00	4.50
Isobutyl, refd, lcl, drs	lb.	...	.12	.12	.60	.60	.75
c-l, drs	lb.	...	.11½	...	...	...	...
tks	lb.	...	.10½	...	...	...	...
Isopropyl, refd, c-l, drs	lb.	...	.55	...	.55	.45	.55
Propyl, norm, 50 gal drs	gal.	...	.75	...	.75	...	.75
Special Solvent, tks, wks	gal.	...	.32	...	...	...	...
Western points, tks, wks	gal.	...	.35	...	...	...	...
Aldehyde ammonia, 100 gal drs	lb.	.80	.82	.80	.82	.80	.82
Alphanaphthol, crude, 300 lb bbls	lb.	.60	.65	.60	.65	.65	.70
Alphanaphthylamine, 350 lb bbls	lb.	.32	.34	.32	.34	.32	.34
Alum, ammonia, lump, c-l, bbls, wks	100 lb.	...	3.00	...	3.00	2.90	3.00
25 bbls or more, wks	100 lb.	...	3.15	...	3.15	...	3.15
less than 25 bbls, wks	100 lb.	...	3.25	...	3.25	...	3.25
Granular, c-l, bbls, wks	100 lb.	...	2.75	...	2.75	...	2.75
25 bbls or more, wks	100 lb.	...	2.90	...	2.90	...	2.90
Powd, c-l, bbls, wks	100 lb.	...	3.15	...	3.15	...	3.15
25 bbls or more, wks	100 lb.	...	3.30	...	3.30	...	3.30
Chrome, bbls	100 lb.	7.00	7.25	7.00	7.25	6.50	7.25
Potash, lump, c-l, bbls, wks	100 lb.	...	3.25	...	3.25	...	3.25
25 bbls or more, wks	100 lb.	...	3.40	...	3.40	...	3.40
Granular, c-l, bbls, wks	100 lb.	...	3.40	...	3.00	...	3.00
25 bbls or more, bbls, wks	100 lb.	...	3.00	...	3.15	...	3.15
Powd, c-l, bbls, wks	100 lb.	...	3.40	...	3.40	...	3.40
25 bbls or more, wks	100 lb.	...	3.55	...	3.55	...	3.55
Soda, bbls, wks	100 lb.	4.00	4.15	4.00	4.15	3.50	4.15
Aluminum metal, c-l NY	100 lb.	20.00	23.30	20.00	23.30	20.00	24.30
Acetate, CP, 20%, bbls	lb.	.09	.10	.09	.10	.09	.10
Chloride anhyd, 99%, wks	lb.	.07	.12	.07	.12	.07	.12
93%, wks	lb.	.05	.08	.05	.08	.04	.08
Crystals, c-l, drs, wks	lb.	.06½	.07	.06½	.07	.06½	.01
Solution, drs, wks	lb.	.03	.03½	.03	.03½	.03	.03½
Hydrate, 96%, light, 90 lb. bbls, delv	lb.	.13	.15	.13	.15	.13	.16½
heavy, bbls, wks	lb.	.04	.04½	.04	.04½	.04	.04½
Oleate, drs	lb.	...	.15¼	...	.15¼	...	.15¼
Palmitate, bbls	lb.	.21	.22	.20	.22	.19	.21
Resinate, pp., bbls	lb.	...	.15	...	.15	.12½	.15
Stearate, 100 lb bbls	lb.	.18	.20	.17	.20	.17	.18
Sulfate, com, c-l, bgs, wks	100 lb.	...	1.35	...	1.35	1.35	1.35
c-l, bbls, wks	100 lb.	...	1.55	...	1.55	1.55	1.55
Sulfate, iron-free, c-l, bgs, wks	100 lb.	...	1.90	...	1.90	1.90	1.90
c-l, bbls, wks	100 lb.	...	2.05	...	2.05	2.05	2.05
Aminoazobenzene, 110 lb kgs	lb.	...	1.15	...	1.15	...	1.15
Ammonia anhyd com, tks	lb.	.04½	.05½	.04½	.05½	.04½	.05½
Ammonia anhyd, 100 lb cyl	lb.	.15¼	.21½	.15¼	.21½	.15¼	.21½
26°, 800 lb drs, delv	lb.	.02½	.03	.02½	.03	.02½	.03
Aqua 26° tks NH	cont.	...	.05	...	.05	...	.05
tk wagon	lb.	...	.024	...	.024	...	...
Ammonium Acetate, kgs	lb.	.26	.33	.26	.33	.26	.33
Bicarbonate, bbls, f.o.b. plant	100 lb.	5.15	5.71	5.15	5.71	5.15	5.71
Bifluoride, 300 lb bbls	lb.	.15	.17	.15	.17	.15	.17
carbonate, tech, 500 lb bbls	lb.	.08	.12	.08	.12	.08	.12
Chloride, White, 100 lb bbls, wks	100 lb	4.45	4.90	4.45	4.90	4.45	5.25
Gray, 250 lb bbls wks	lb.	5.00	5.75	5.00	5.75	5.00	5.75
Lump, 500 lbs cks spot	lb.	.10½	.11	.10½	.11	.10	.11
Lactate, 500 lb bbls	lb.	.15	.16	.15	.16	.15	.16
Linoleate	lb.	.11	.12	.11	.12	.11	.12
Nitrate, tech, cks	lb.	.04	.05	.04	.05	.03¾	.05
Oleate, drs	lb.	...	.10	...	.10	...	.10
Oxalate, neut, cryst, powd, bbls	lb.	.26	.27	.26	.27	.26	.27
pure, cryst, bbls, kgs	lb.	.27	.28	.27	.28	.27	.28
Serchlorate, kgs	lb.	...	.16	...	.16	.16	.16
Persulfate, 112 lb kgs	lb.	.22½	.25	.22½	.25	.20	.25
Phosphate, dibasic tech, powd, 325 lb bbls	lb.	.08	.10	.08	.10	.08	.11½
Sulfate, dom, f.o.b., bulk	ton	...	24.00	...	24.00	22.00	25.00
200 lb bgs	ton	...	25.80	...	25.80	...	25.80
100 lb bgs	lb.	...	26.50	...	26.50	...	26.50
Sulfocyanide, kgs	lb.	...	.50	...	.50	...	.50
Amyl Acetate (from pentane) tks delv	lb.	...	.13½	...	.13½	...	.13½
tech, drs, delv	lb.	.142	.149	.142	.149	.142	.149
secondary, tks, delv	lb.	...	.108	...	.108	.09	.108
c-l, drs, delv	lb.	.118	.123	.118	.123	...	.123
Alcohol, see Alcohol, Amyl, also Fusel Oil.							

g Grain alcohol 20c a gal. higher in each case.

		Current Market		1935 Low	1935 High	1934 Low	1934 High
Amyl Chloride, norm drs, wks	lb.	.56	.68	.56	.68	.56	.68
Chloride, mixed, drs, wks	lb.	.07	.077	.07	.077	.07	12.2
tks, wks	lb.	...	.06	...	.06	.06	10.5
Lactate, drs, wks	lb.	...	.50	...	.50	...	.50
Mercaptan, drs, wks	lb.	...	1.10	...	1.10	...	1.10
Stearate, drs, wks	lb.	...	.31	...	.31	...	.31
Amylene, drs, wks	lb.	.102	.11	.102	.11	.10	.11
tks, wks	lb.	...	.09	...	.09	...	.09
Aniline Oil, 960 lb drs and tks	lb.	.15	.17½	.15	.17½	.15	.17½
Annatto fine	lb.	.34	.37	.34	.37	.34	.37
Anthracene, 80%	lb.	...	.75	...	.75	...	.75
40%	lb.	...	.18	...	.18	...	.18
Anthraqumone, sublimed, 125 lb bbls	lb.	.50	.52	.50	.52	.45	.50
Antimony, metal slabs, ton lots	lb.	.12¾	.14¼	.12¾	.15	.07	.14½
Needle, powd, bbls	lb.	.11½	.13½	.09	.13½	.07	.09
Butter of, see Chloride.							
Chloride, soln cbys	lb.	.13	.17	.13	.17	.13	.17
Oxide, 500 lb bbls	lb.	.11	.13	.10¼	.13	.08	.11
Salt, 63% to 65%, tins	lb.	.22	.24	.22	.24	.22	.24
Sulfuret, golden, bbls	lb.	.22	.23	.19	.23	.16	.23
Vermilion, bbls	lb.	.35	.42	.35	.42	.35	.42
Archil, conc, 600 lb bbls	lb.	.21	.27	.21	.27	.21	.27
Double, 600 lb bbls	lb.	.18	.20	.18	.20	.18	.20
Triple, 600 lb bbls	lb.	.18	.20	.18	.20	.18	.20
Arglos, 80%, casks	lb.	.15	.16	.15	.16	.15	.16
Crude, 30%, casks	lb.	.07	.08	.07	.08	.07	.09
Aroclors, wks	lb.	.18	.30	.18	.30	.18	.30
Arrowroot, bbl	lb.	.08¾	.09	.08¾	.09¾	.08¾	.09¼
Arsenic, Red, 224 lb cs kgs	lb.	...	.15¾	...	.15¾	.14	.15¾
White, 112 lb kgs	lb.	.03½	.04½	.03½	.04½	.03½	.05
Metal	lb.	.40	.42	.40	.42	.40	.45
Asbestine, c-l wks	ton	13.00	15.00	13.00	15.00	13.00	15.00
Barium Carbonate precip, 200 lb bgs, wks	ton	56.50	61.00	56.50	61.00	56.50	61.00
Nat (witherite) 90% gr, c-l, wks, bgs	ton	42.00	45.00	42.00	45.00	42.00	45.00
Chlorate, 112 lb kgs NY	lb.	.15½	.17½	.14	.17½	.14	.16
Chloride, 600 lb bbl wks	ton	72.00	74.00	72.00	74.00	72.00	74.00
Dioxide, 88%, 690 lb drs	lb.	.11	.12	.11	.12	.11	.13
Hydrate, 500 lb bbls	lb.	.05½	.06	.05½	.06	.04¾	.06
Nitrate, 700 lb cks	lb.	...	.08¼	...	.08¼	...	.08¼
Barytes, floated, 350 lb bbls wks	ton	23.65	31.15	23.00	31.15	23.00	30.50
Bauxite, bulk, mines	ton	7.00	10.00	7.00	10.00	5.00	10.00
Benzaldehyde, tech, 945 lb drs, wks	lb.	.60	.62	.60	.62	.60	.65
Benzene (Benzol), 90%, Ind, 8000 gal tks, frt allowed	gal.	...	.15	...	.15	.15	.20½
90% c-l, drs	gal.	...	.24	...	.24	...	.24
Ind Pure, tks, frt allowed	gal.	...	.15	...	.15	.15	.20½
Benzidine Base, dry, 250 lb bbls	lb.	.67	.69	.67	.69	.67	.69
Benzoyl Chloride, 500 lb drs	lb.	.40	.45	.40	.45	.40	.45
Benzyl Chloride, tech, drs	lb.	.30	.40	.30	.40	.30	.40
Beta-Naphthol, 250 lb bbl, wks	lb.	...	.24	...	.24	...	.24
Naphthylamine, sublimed, 200 lb bbls	lb.	1.25	1.35	1.25	1.35	1.25	1.35
Tech, 200 lb bbls	lb.	.53	.55	.53	.55	.53	.58
Bismuth metal		1.10	1.20	1.10	1.20	1.10	1.30
Chloride, boxes	lb.	3.20	3.25	3.20	3.25	...	...
Hydroxide, boxes	lb.	3.15	3.20	3.15	3.20	...	...
Oxychloride, boxes	lb.	2.95	3.00	2.95	3.00	...	...
Subbenzoate, boxes	lb.	3.25	3.30	3.25	3.30	...	...
Subcarbonate, kgs	lb.	1.55	1.65	1.55	1.70	...	...
Trioxide, powd, boxes	lb.	3.45	3.50	3.45	3.50	...	...
Subnitrate		1.40	1.45	1.40	1.45	1.40	1.60
Blackstrap, cane (see Molasses, Blackstrap).							
Blanc Fixe, 400 lb bbls, wks	ton *h*	42.50	70.00	42.50	70.00	42.50	70.00
Bleaching Powder, 800 lb drs c-l wks contract	100 lb.	...	1.90	...	1.90	...	1.90
lcl, drs, wks	lb.	2.15	3.50	2.15	3.50	2.00	3.50
Blood, dried, f.o.b., NY	unit	...	2.90	2.75	3.25	2.40	3.25
Chicago, high grade	unit	...	2.85	2.75	3.75	2.00	3.10
Imported shipt	unit	...	2.80	2.80	3.10	2.75	3.20
Blues, Bronze Chinese Milori Prussian Soluble	lb.	.36½	.38	.36½	.38	.35½	.38
Bone, 4½ + 50% raw, Chicago	ton	19.00	20.00	19.00	20.00	19.00	25.00
Bone Ash, 100 lb kgs	lb.	.06	.07	.06	.07	.06	.07
Black, 200 lb bbls	lb.	.05½	.08¼	.05½	.08¼	.05½	.08¼
Meal, 3% & 50%, imp	ton	..	24.00	23.00	24.00	16.00	24.00
Domestic, bgs, Chicago	ton	16.50	17.00	16.00	18.00	...	...
Borax, tech, gran, 80 ton lots, sacks, delv	ton *i*	...	36.00	...	36.00	36.00	36.00
bbls, delv	ton *i*	...	46.00	...	46.00	46.00	46.00
c-l, sacks, delv	ton *i*	...	40.00	...	40.00	40.00	40.00
c-l, bbls, delv	ton *i*	...	50.00	...	50.00	50.00	50.00
Tech, powd, 80 ton lots, sacks	ton *i*	...	41.00	...	41.00	41.00	41.00
bbls, delv	ton *i*	...	51.00	...	51.00	51.00	51.00
c-l, sacks, delv	ton *i*	...	45.00	...	45.00	45.00	45.00
c-l, bbls, delv	ton *i*	...	55.00	...	55.00	55.00	55.00
Bordeaux Mixture, jobbers, East, c-l, tins, drs, cases	lb.	.08	.16	.08	.16	...	.16
Jobbers, West, c-l	lb.	.08	.10	.08	.10	...	.10
Dealers, East, c-l	lb.	.08½	.16½	.08½	.16½	...	.16½
Dealers, West, c-l	lb.	.09	.11	.09	.11	...	.11

h Lowest price is for pulp, highest for high grade precipitated; *i* Crystals $6 per ton higher; USP, $15 higher in each case.



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Bromine
Chromium Fluoride

Prices

	Current Market	1935 Low	1935 High	1934 Low	1934 High
Bromine, cases .....lb.	.30 .43	.30	.43	.30	.43
Bronze, Al, pwd, 300 lb drs lb.	.80 1.50	.80	1.50	.80	1.50
Gold, blk .....lb.	.40 .55	.40	.55	.40	.55
Butanes, com 16-32° group 3 tks .....lb.	... .04	...	.04	.02¾	.04
Butyl, Acetate, norm drs, frt allowed .....lb.	.13 .13½	.13	.13½	.11	.14
tks, frt allowed .....lb.	.12 .13	.12	.13	.10	.13
Secondary tks, frt allowed lb.	.. .096	...	.096	.08	.096
drs, frt, allowed .....lb.	.106 .111	.106	.111	...	.111
Aldehyde, 50 gal drs wks lbs.	.19 .21	.19	.21	.19	.36
Secondary, drs .....lb.	.60 .75	.60	.75	.60	.75
Carbinol, norm drs, wks lb.	.60 .75	.60	.75	.60	.75
Lactate drs .....lb.	.22½ .23½	.22½	.23½	.22½	.29
Propionate, drs .....lb.	.18 .18½	.18	.18½	.17	.22
tks, delv .....lb.	... .17	...	.17	...	.17
Stearate, 50 gal drs ....lb.	... .26	...	.26	.25	.26
Tartrate, drs .....lb.	.55 .60	.55	.60	.55	.60
Cadmium, Sulfide, boxes...lb.	.75 .85	.75	.85	.65	.85
Cadmium Metal .....lb.	.65 .70	.55	.70	.55	.65
Calcium, Acetate, 150 lb bgs c-l, delv .....100 lb.	... 2.10	2.00	2.10	2.00	3.00
Arsenate, jobbers, East of Rocky Mts, drs .....lb.	.06 .06½	.06	.06½	...	...
dealers, drs .....lb.	.06¼ .07½	.06¼	.07½	...	...
South, jobbers, drs .....lb.	.06 .06½	.06	.06½	...	...
dealers, drs .....lb.	.06½ .06¾	.06¼	.06¾	...	...
Carbide, drs .....lb.	.05 .06	.05	.06	.05	.06
Carbonate, tech, 100 lb bgs c-l .....lb.	1.00 1.00	1.00	1.00	1.00	1.00
Chloride, flake, 375 lb drs c-l wks .....ton	... 19.50	...	19.50	...	19.50
Solid, 650 lb drs c-l f.o.b. wks .....ton	... 17.50	...	17.50	...	17.50
Ferrocyanide, 350 lb bbls wks .....lb.	... .17	...	.17	...	.17
Gluconate, tech, 125 lb bbls .....lb.	... .28	...	.28	.25	.28
Nitrate, 100 lb bgs .....ton	... 26.50	...	26.50	...	26.50
Palmitate, bbls .....lb.	.21 .22	.20	.22	.19	.20
Peroxide, 100 lb drs ....lb.	... 1.25	...	1.25	...	1.25
Phosphate, tech, 450 lb bbls .....lb.	.07½ .08	.07½	.08	.07½	.08
Resinate, precip, bbls ...lb.	.13 .14	.13	.14	.13	.14
Stearate, 100 lb bbls....lb.	.18 .20	.17	.20	.17	.19
Camphor, slabs .....lb.	.49 .50	.49	.52	.51	.59
Powder .....lb.	.49 .50	.50	.52	.51	.59
Camwood, Bk, ground bbls lb.	.16 .18	.16	.18	.16	.18
Carbon, Decolorizing, drs c-l .....lb.	.08 .15	.08	.15	.08	.15
Black, c-l, bgs, delv, price varying with zone ....lb.	.0445 .0535	.0445	.0535	.0445	.0535
lcl, bgs, delv, all zones lb.	... .07	...	.07	.06½	.07
cartons, delv .....lb.	... .07¾	...	.07¾	...	.07¾
cases, delv .....lb.	... .08¼	...	.08¼	...	.08¼
Bisulfide, 500 lb drs....lb.	.05¼ .08	.05¼	.08	.05½	.08
Dioxide, Liq 20-25 lb cyl lb.	.06 .08	.06	.08	.06	.08
Tetrachloride, 1400 lb drs, delv .....lb.	.05¼ .06	.05¼	.06	.05¼	.06
Casein, Standard, Dom grd lb.	.12 .14½	.09½	.15	.09¼	.13
80-100 mesh, c-l, bgs ....lb.	.12½ .15¾	.10	.16	.10	.14
Castor Pomace, 5½ NH_3, cl, bgs, wks .....ton	... 17.00	17.00	18.50	...	...
Imported, ship, bgs ....ton	... 18.75	18.75	20.00	...	...
Celluloid, Scraps, ivory cs lb.	.17 .18	.17	.18	.13	.18
Transparent, cs .....lb.	... .20	...	.20	.16	.20
Cellulose, Acetate, 50 lb kgs .....lb.	.55 .60	.55	.60	.55	.90
Chalk, dropped, 175 lb bbls lb.	.03 .03¼	.03	.03¼	.03	.03¼
Precip, heavy, 560 lb cks lb.	.03 .04	.03	.04	.03	.04
Light, 250 lb cks .....lb.	.03 .04	.03	.04	.03	.04
Charcoal, Hardwood, lump, blk, wks .....bu.	... .15	...	.15	.12	.18
Willow, powd, 100 lb bbl wks .....lb.	.06 .06¼	.06	.06¼	.06	.06¼
bgs, delv ... .ton	22.40 23.00	22.40	30.00	...	...
Chestnut, clarified bbls wks lb.	... .01⅞	...	.01⅞	.01⅝	.01⅞
25% tks wks .....lb	... .01½	...	.01½	.01¼	.01½
Pwd, 60%, 100 lb bgs, wks .....lb	.. .04⅞	...	.04⅞	...	.04⅞
China Clay, c-l, blk mines ton	... 7.00	...	7.00	7.00	9.00
Powdered, bbls .....lb.	.01 .02	.01	.02	.01	.02
Pulverized, bbls wks ...ton	10.00 12.00	10.00	12.00	10.00	12.00
Imported, lump, blk ...ton	15.00 25.00	15.00	25.00	15.00	25.00
Chlorine, cyls, lcl, wks contract .....lb.	.07½ .08½	.07½	.08½	.07	.08½
cyls, c-l, contract .. lb. *j*	... .05½	...	.05½	...	.05½
Liq tk wks contract..100 lb.	... 2.00	...	2.00	1.85	2.00
Multi c-l cyls wks cont..lb.	2.15 2.40	2.15	2.40	2.00	2.40
Chloroacetophenone, tins, wks .....lb.	... 2.00	...	2.00	...	...
Chlorobenzene, Mono, 100 lb drs, lc-l, wks .....lb.	.06 .07½	.06	.07½	.06	.07½
Chloroform, tech, 1000 lb drs .....lb.	.20 .21	.20	.21	.20	.21
USP, 25 lb tins .....lb.	.30 .31	.30	.31	.30	.35
Chloropicrin; comml cyls..lb.	.85 .90	.85	.90	.85	1.25
Chrome, Green, CP .....lb.	.17 .18½	.17	.30	.20	.30
Yellow .....lb.	.14 .16	.14	.16	.15	.16
Chromium, Acetate, 8% Chrome bbls .....lb.	.05 .05¾	.05	.05¾	.05	.05¾
20° soln, 400 lb bbls .. lb.	... .05½	...	.05½	...	.05½
Fluoride, powd, 400 lb bbl .....lb.	.27 .28	.27	.28	.27	.28

j A delivered price.

Current

	Current Market		1935 Low	1935 High	1934 Low	1934 High
Coal tar, bbls .....bbl.	7.25	9.00	7.25	9.00	7.25	9.00
Cobalt Acetate, bbls .....lb.	...	.60	...	.60	.60	.80
Carbonate tech, bbls ....lb.	1.35	1.40	1.35	1.40	1.34	1.40
Hydrate, bbls .....lb.	1.66	1.76	1.66	1.76	1.66	1.76
Linoleate, paste, bbls ...lb.	...	.30	...	.30	.30	.40
Resinate, fused, bbls ...lb.	...	.12½	...	.12½	...	.12½
Precipitated, bbls .....lb.	...	.32	...	.32	.32	.42
Cobalt Oxide, black, bgs ..lb.	1.25	1.35	1.25	1.35	1.25	1.35
Cochineal, gray or bk bgs lb.	.34	.39	.34	.39	.33	.42
Teneriffe silver, bgs ....lb.	.35	.40	.35	.40	.34	.43
Copper, metal, electrol 100 lb.	...	9.00	...	9.00	7.87½	9.00
Carbonate, 400 lb bbls ..lb.	...	.08¼	...	.08¼	...	.08¼
52-54% bbls .....lb.	.14½	.16¼	.14½	.16¼	.15½	.16
Chloride, 250 lb bbls ...lb.	.17	.18	.17	.18	.17	.18
Cyanide, 100 lb drs ....lb.	.37	.38	.37	.38	.37	.40
Oleate, precip, bbls .....lb.	...	.20	...	.20	...	.20
Oxide, red, 100 lb bbls ..lb.	.15	.17	.15	.17	.12½	.17
black bbls, wks .....lb.	.14½	.15	.14	.16½	...	...
Resinate, precip, bbls ...lb.	.18	.19	.18	.19	.18	.19
Stearate, precip, bbls .. lb.	.35	.40	.35	.40	.35	.40
Sub-acetate verdigris, 400 lb bbls .....lb.	.18	.19	.18	.19	.18	.19
Sulfate, bbls c-l wks 100 lb.	...	3.85	...	3.85	3.75	3.85
Copperas, crys and sugar bulk c-l, wks, bgs .....ton	12.00	13.00	12.00	13.00	12.00	14.50
Corn Syrup, 42 deg, bbls .....100 lb.	...	3.63	3.49	3.63	3.04	3.59
43 deg, bbls .....100 lb.	...	3.68	3.54	3.68	3.09	3.64
Corn Sugar, tanners, bbls .....100 lbs.	...	3.56	3.46	3.66	...	...
Cotton, Soluble, wet, 100 lb bbls .....lb.	.40	.42	.40	.42	.40	.42
Cream Tartar, USP, powd & gran, 300 lb bbls .....lb.	...	.16¾	.16¼	.17¼	.17½	.19½
Creosote, USP, 42 lb cbys lb.	.45	.47	.45	.47	.45	.47
Oil, Grade 1, tks .....gal.	.11½	.12½	.11½	.12½	.10	.12½
Grade 2 .....gal.	.10½	.11½	.10½	.11½	.10½	.12
Cresol, USP, drs .....lb.	.11	.11½	.11	.11½	.11	.11½
Crotonaldehyde, 98% 50 gal drs .....lb.	.32	.36	.32	.36	.26	.36
Cudbear, English .....lb.	.19	.25	.19	.25	.19	.25
Philippine, 100 lb bale ..lb.	.03¾	.04¾	.03½	.04¾	.03½	.04¾
Cyanamid, bags c-l frt allowed Ammonia unit	...	1.07½	...	1.07½	...	1.07½
Dextrin, corn, 140 lb bgs f.o.b., Chicago ...100 lb.	...	4.05	3.95	4.15	3.50	4.20
British Gum, bgs ...100 lb.	4.30	4.50	4.20	4.50	3.75	4.60
White, 140 lb bgs ..100 lb.	4.00	4.10	3.90	4.10	3.47	4.20
Potato, Yellow, 220 lb bgs .....lb.	.07¾	.08¾	.07¾	.08¾	.07¾	.08¾
White, 220 lb bgs, lcl ...lb.	.08	.09	.08	.09	.08	.09
Tapioca, 200 bgs, lcl ....lb.	...	.08	.08	.08¾	.06¾	.08¾
Diamylamine, drs, wks ....lb.	...	1.00	...	1.00	...	1.00
Diamylene, drs, wks .....lb.	.095	.102	.095	.102	.09	.102
tks, wks .....lb.	...	.08½	...	.08½	...	.08½
Diamylether, wks, drs ....lb.	.085	.092	.085	.092	.09	.77
tks, wks .....lb.	...	.075	...	.075	...	...
Diamylphthalate, drs wks gal.	.18	.19½	.18	.20½	...	.20½
Diamyl Sulfide, drs, wks lb.	...	1.10	...	1.10	...	1.10
Dianisidine, bbls .....lb.	2.25	2.45	2.25	2.45	2.35	2.45
Dibutylphthalate, drs, wks lb.	.20	.21	.20	.23	.20½	.21
Dibutyltartrate, 50 gal drs lb.	.35	.40	.35	.40	.35	.40
Dichlorethylene, drs .....gal.	.29	...	.29	...	.29	...
Dichloroethylether, 50 gal drs, wks .....lb.	.16	.17	.16	.17	.16	.21
tks, wks .....lb.	...	.15	...	.15	...	.15
Dichloromethane, drs, wks lb.	...	.23	.15	.23	...	.15
Dichloropentanes, drs, wks lb.	.032	.040	.032	.040	.0278	.040
tks, wks .....lb.	...	.02½	...	.02½	...	.02½
Diethanolamine, tks .....lb.	...	.30	...	...	...	...
Diethylamine, 400 lb drs ..lb.	2.75	3.00	2.75	3.00	2.75	3.00
Diethyl Carbinol, drs .....lb.	.60	.75	.60	.75	.60	.75
Diethylcarbonate, com drs lb.	.31⅜	.35	.31⅜	.35	.31⅜	.35
90% grade, drs .....lb.	...	.25	...	.25	...	.25
Diethylaniline, 850 lb drs..lb.	.52	.55	.52	.55	.52	.55
Diethylorthotoluidin, drs ..lb.	.64	.67	.64	.67	.64	.67
Diethyl phthalate, 1000 lb drs .....lb.	.18½	.19	.18½	.27	.26	.27
Diethylsulfate, tech, 50 gal drs .....lb.	...	...	...	...	...	...
Diethyleneglycol, drs .....lb.	.15½	.17½	.15½	.17½	.14	.16
Mono ethyl ethers, drs..lb.	.15	.17	.15	.17	.15	.17
tks, wks .....lb.	...	.15	...	.15	...	...
Mono butyl ether, drs ..lb.	...	.26	...	.26	...	.26
Diethylene oxide, 50 gal drs wks .....lb.	.20	.24	.20	.27	.26	.27
Diglycol Oleate, bbls .....lb.	.16	.24	.16	.24	.16	.18
Dimethylamine, 400 lb drs, pure 25 & 40% sol 100% basis .....lb.	...	.95	...	.95	.95	1.20
Dimethylaniline, 340 lb drs lb.	.29	.30	.29	.30	.29	.30
Dimethyl Ethyl Carbinol, drs .....lb.	.60	.75	.60	.75	.60	.75
Dimethyl phthalate, drs ...lb.	.20	.21½	.20½	.24½	.24	.24½
Dimethysulfate, 100 lb drs lb.	.45	.50	.45	.50	.45	.50
Dinitrobenzene, 400 lb bbls .....lb. *k*	.17	.19½	.17	.19½	.17	.19½
Dintrochlorobenzene, 400 lb bbls .....lb.	.14	.15½	.14	.15½	.14	.15½
Dinitronaphthalene, 350 lb bbls .....lb.	.34	.37	.34	.37	.34	.37
Dinitrophenol, 350 lb bbls lb.	.23	.24	.23	.24	.23	.24
Dinitrotoluene, 300 lb bbls lb.	.15½	.16½	.15½	.16½	.15½	.16½
Diphenyl .....lb.	.15	.25	.15	.25	.15	.25
Diphenylamine .....lb.	.31	.32	.31	.32	.31	.34
Diphenylguanidine, 100 lb bbl .....lb.	.36	.37	.36	.37	.36	.37

k Higher price is for purified material.

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PARA FORMALDEHYDE
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BENZOATE OF SODA
BENZOIC ACID
BENZOYL CHLORIDE
BENZYL CHLORIDE
BENZALDEHYDE
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ACETYL SALICYLIC ACID
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METHYL SALICYLATE
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MECHLING BROS. CHEMICAL COMPANY
PHILADELPHIA CAMDEN, N.J. BOSTON, MASS.

	Current Market	1935 Low	1935 High	1934 Low	1934 Hig
Dip Oil, see Tar Acid Oil.					
Divi Divi pods, bgs shipmt. ton	36.00 40.00	36.00	40.00	35 00	40.00
Extract .....lb.	.05 .05½	.05	.05½	.05	.05½
Egg Yolk, 200 lb. cases ...lb.	... .63	.46	.63	.40	.54
Epsom Salt, tech, 300 lb bbls c-l NY .....100 lb.	1.80 2.00	1.80	2.25	2.20	2.25
USP, c-l, bbls .....100 lb.	... 2.00	2.00	2.25	2.25	2.25
Ether, USP anaesthesia 55 lb drs .....lb.	.22 .23	.22	.23	.22	.24
(Conc) .....lb.	.09 .10	.09	.10	.09	.10
Ether, Isopropyl 50 gal drs lb.	.07 .08	.07	.08	.07	.08
tks, frt allowed .....lb.	... .06	...	.06	...	...
Nitrous, conc, bottles ...lb.	.75 .77	.75	.77	.75	.77
Synthetic, wks, drs ....lb.	.08 .09	.08	.09	.08	.09
Ethyl Acetate, 85% Ester tks .....lb.	.07½ .08	.07½	.08	.07½	.08
drs .....lb.	.08½ .09	.08½	.09	.08½	.09
Anhydrous, tks .....lb.	... .08½	...	.08½	.08½	.10
drs .....lb.	.09½ .10	.09½	.10	.09½	.10½
Acetoacetate, 50 gal drs lb.	.65 .68	.65	.68	.65	.68
Benzylaniline, 300 lb drs lb.	.88 .90	.88	.90	.88	.90
Bromide, tech, drs .....lb.	.50 .55	.50	.55	.50	.55
Chloride, 200 lb drs ....lb.	.22 .24	.22	.24	.22	.24
Chlorocarbonate cbys ...lb.	... .30	...	.30	...	.30
Crotonate, drs .....lb.	1.00 1.25	1.00	1.25	1.00	1.25
Ether, Absolute, 50 gal drs .....lb.	.50 .52	.50	.52	.50	.52
Lactate, drs, wks .....lb.	.25 .29	.25	.29	.25	.33
Methyl Ketone, 50 gal drs, frt allowed .....lb.	.08½ .09	.08½	.09	.08½	.09
tks, frt allowed .....lb.	... .07½	...	.07½	...	...
Oxalate, drs, wks .... lb.	.37½ .55	.37½	.55	.37½	.55
Oxybutyrate, 50 gal drs wks .....lb.	.30 .30½	.30	.30½	.30	.30½
Ethylene Dibromide, 60 lb drs .....lb.	.65 .70	.65	.70	.65	.70
Chlorhydrin, 40%, 10 gal cbys chloro, cont .....lb.	.75 .85	.75	.85	.75	.85
Dichloride, 50 gal drs ..lb.	.0545 .0994	.0545	.0994	.0545	.09
Glycol, 50 gal drs, wks lb.	.17 .21	.17	.28	.26	.28
tks, wks .....lb.	... .16	...	...	...	...
Mono Butyl Ether, drs, wks	.20 .21	.20	.21	.20	.21
tks, wks .....lb.	... .19	...	.19	.19	.19
Mono Ethyl Ether, drs, wks	.16 .17	.16	.17	.15	.17
tks, wks .....lb	... .15	...	.15	.15	.15
Mono Ethyl Ether Acetate, drs, wks	.17½ .18½	.17½	.18½	.16½	.18½
tks, wks .....lb.	... .16½	...	.16½	.16½	.16½
Mono, Methyl Ether, drs wks .....lb.	.19 .23	.19	.23	.21	.23
tks, wks .....lb.	... .18	...	...	...	...
Stearate	.18 .18	.18	.18	.18	.18
Oxide, cyl .....lb.	... .75	...	.75	...	.75
Ethylidenaniline .....lb.	.45 .47½	.45	.47½	.45	.47½
Feldspar, blk pottery .....ton	... 14.50	...	14.50	...	14.50
Powd, blk, wks .....ton	14.00 14.50	14.00	14.50	13.50	14.50
Ferric Chloride, tech, crys, 475 lb bbls .....lb.	.05 .07½	.05	.07½	.05	.07½
sol, cbys .....lb.	.06¼ .06½	.06¼	.06½	...	...
Fish Scrap, dried, unground, wks .....unit *l*	... 2.50	2.50	2.90	2.25	2.60
Acid, Bulk, 6 & 3%, delv Norfolk & Baltimore basis .....unit *m*	... 2.25	2.00	2.25	2.00	2.50
Fluorspar, 98%, bgs	30.00 35.50	28.00	35.50	28.00	35.50
Formaldehyde, USP, 400 lb bbls, wks .....lb.	.06 .07	.06	.07	.06	.07
Fossil Flour .....lb.	.02½ .04	.02½	.04	.02½	.04
Fullers Earth, blk, mines .....ton	6.50 15.00	6.50	15.00	6.50	15.00
Imp powd, c-l, bgs .....ton	23.00 30.00	23.00	30.00	23.00	30.00
Furfural (tech) drs, wks lb.	.10 .15	.10	.15	.10	.15
Furfuramide (tech) 100 lb drs .....lb.	... .30	...	.30	...	.30
Fusel Oil, 10% impurities lb.	.16 .18	.16	.18	.16	.18
Fustic, chips .....lb.	.04 .05	.04	.05	.04	.05
Crystals, 100 lb boxes ..lb.	.20 .23	.20	.23	.20	.23
Liquid 50°, 600 lb bbls..lb.	.08½ .12	.08½	.12	.08½	.12
Solid, 50 lb boxes .....lb.	.16 .18	.16	.18	.16	.18
Sticks .....ton	25.00 26.00	25.00	26.00	25.00	26.00
G Salt paste, 360 lb bbls ..lb.	.42 .43	.42	.43	.42	.43
Gall Extract .....lb.	.18 .20	.18	.20	.18	.20
Gambier, com 200 lb bgs ..lb.	... .06	.05	.08	.04	.08
Singapore cubes, 150 lb bgs .....100 lb.	.08 .09	.07⅛	.09⅛	.05	.09⅛
Gelatin, tech, 100 lb cs ...lb.	.50 .55	.50	.55	.45	.55
Glauber's Salt, tech, c-l wks .....100 lb.	1.10 1.30	1.10	1.30	1.10	1.30
Anhydrous, see Sodium Sulfate.					
Glucose (grape sugar) dry 70-80° bgs, c-l, NY ..100 lb.	3.24 3.34	3.24	3.34	3.24	3.34
Tanner's Special, 100 lb. bgs .....100 lb.	... 2.33	...	2.33	...	2.33
Glue, bone, com grades, c-l bgs .....lb.	... .08	...	.08	.07	.12½
Better grades, c-l, bgs lb.	.09 .09½	.09	.09½	.09½	.16
Casein, kgs .....lb.	.18 .22	.18	.22	.18	.22
Hide, high grd, c-l, bgs..lb.	.23 .28	.23	.28	.23	.28
Med grd, c-l, bgs .....lb.	.19 .23	.19	.23	.19	.23
Low grd, c-l, bgs .... lb.	.13½ .19	.13½	.19	.13½	.19
Glycerin, CP, 550 lb drs ..lb.	.14 .14½	.14	.14½	.11	.14½
Dynamite, 100 lb drs ...lb.	.13¾ .14¼	.13¾	.14¼	.10	.14¼
Saponification, drs .....lb.	.10½ .11	.10	.11	.06¾	.10½
Soap Lye, drs .....lb.	.09½ .10	.09	.10	.06¾	.09⅛

l + 10; *m* + 50.

Current

Glyceryl Phthalate
Gum, Yacca

	Current Market	1935 Low	1935 High	1934 Low	1934 High
Glyceryl Phthalate ..... lb.	...	.28	...	.28	...	.28
Glyceryl Stearate, bbls....lb.	...	.18	...	.18	...	.18
Glycol Phthallate .....lb.	...	.29	.28	.29	...	.28
Glycol Stearate .....lb.	...	.23	.18	.23	.18	.20
Graphite, Crystalline, 500 lb bbls .....lb.	.04	.05	.04	.05	.04	.05
Flake, 500 lb. bbls .....lb.	.08	.16	.08	.16	.08	.16
Amorphous, bbls .....lb.	.03	.04	.03	.04	.03	.04
GUMS						
Gum Aloes, Barbadoes ....lb.	.87	.90	.87	.90	.85	.90
Animi (Zanzibar) bean & pea, 250 lb cases .....lb.	.35	.40	.35	.40	.35	.40
Glassy, 250 lb cases ....lb.	.50	.55	.50	.55	.50	.55
Arabic, amber sorts .....lb.	.11½	.14	.09½	.14	.07¾	.10⅝
White sorts, No. 1, bgs .....lb.	.21	.22	.21	.22	...	...
No. 2, bgs .....lb.	.19	.20	.19	.21	...	...
Powd, bbls .....lb.	.15½	.16½	.13½	.16½	...	...
Asphaltum, Barbadoes (Manjak) 200 lb bgs, f.o.b., NY .....lb.	.02½	.10½	.02½	.10½	.02½	.10½
Egyptian, 200 lb cases, f.o.b. NY ..... .lb.	.12	.15	.12	.15	.12	.15
California, f.o.b. NY, drs .....ton	29.00	55.00	29.00	55.00	...	...
Benzoin Sumatra, USP, 120 lb cases .....lb.	.21	.22	.20	.28	.18½	.23
Copal Congo, 112 lb bgs, clean, opaque .....lb.	.21¾	.22¼	.21¾	.24⅝	.24⅛	.28
Dark, amber .....lb.	.07¼	.07¾	.07¼	.09¼	.08⅝	.10½
Light, amber .....lb.	.12½	.13	.12	.14⅞	.14⅜	.19
Copal, East India 180 lb bgs Macassar pale bold ....lb.	.09½	.10	.09½	.10¾	.09⅞	.10½
Chips .....lb.	.05½	.06	.05½	.06	...	...
Nubs .....lb.	.08½	.09	.08½	.09	...	...
Dust .....lb.	.04	.04½	.03¾	.04½	...	...
Singapore						
Bold .....lb.	.15⅝	.16⅛	.15⅝	.17	.16	.17
Chips .....lb.	.04⅝	.05⅛	.04⅜	.05⅛	...	...
Nubs .....lb.	.10	.10½	.10	.11	...	...
Dust .....lb.	.04	.04½	.03¾	.04½	...	...
Copal Manilla, 180-190 lb baskets, Loba A .....lb.	.11¾	.12¼	.11¾	.12¼	.11⅜	.14½
Loba B .....lb.	.10¾	.11¼	.10¼	.11¼	.10¼	.13½
Loba C .....lb.	.10⅛	.10⅝	.10⅛	.11⅜	.09¾	.12
MA sorts .....lb.	.06	.06½	.06	.07¼	.06½	.07½
DBB .....lb.	.08¼	.08¾	.08	.08¼	.08	.09½
Dust .....lb.	.04⅞	.05⅜	.04⅞	.05⅜	...	...
Copal Pontianak, 224 lb cases, bold genuine .....lb.	.14⅜	.14⅞	.14⅜	.16⅝	.16⅛	.19
Mixed .....lb.	.12⅞	.13⅜	.12⅞	.14½	...	...
Chips .....lb.	.06⅞	.07¾	.06⅞	.07⅞	...	...
Nubs .....lb.	.09⅜	.10⅛	.09⅝	.10¾	...	...
Split .....lb.	.12⅞	.13⅜	.13⅞	.13⅜	...	...
Dammar Batavia, 136 lb cases A .....lb.	.20⅛	.20⅝	.19	.21¼	...	...
B .....lb.	.19⅛	.19⅝	.18	.20¼	...	...
C .....lb.	.17	.17⅛	.16	.18¼	...	...
D .....lb.	.12½	.13	.11¾	.13⅞	...	...
A/D .....lb.	.15	.15½	.14	.16	...	...
A/E .....lb.	.12½	.13½	.11¾	.13½	...	...
E .....lb.	.06¾	.07¼	.07	.07¼	.07	.09½
F .....lb.	.06⅜	.06⅞	.06⅛	.06⅞	.05½	.06⅝
Singapore						
No. 1 ..... lb.	.15⅝	.16⅛	.15⅝	.17	.15½	.18
No. 2 .....lb.	.11	.11½	.10⅝	.11⅝	.09⅜	.11
No. 3 .....lb.	.04⅞	.05⅜	.04⅝	.05⅞	.05⅛	.07
Chips .....lb.	.08⅞	.09⅜	.08⅞	.09¾	.09	.10¼
Dust .....lb.	.06¼	.06¾	...	05¾	.05	.06
Seeds .....lb.	.06¼	.06¾	.04¾	.07¼	.06	.07¾
Ester .....lb.	.07⅝	.08⅜	.07¼	.08⅜	...	...
Elemi, cons .....lb.	.11¾	.12¼	...	...	...	...
Gamboge, pipe, cases .....lb.	.57	.58	.57	.65	.57	.65
Powdered, bbls .....lb.	.65	.70	.65	.75	.67	.75
Ghatti, sol. bgs .....lb.	.11	.15	.09	.15	.09	.09½
Karaya, pow bbls xxx ....lb.	.24	.25	.23	.25	.23	.25
xx .....lb.	.16	.17	.15	.17	.15	.16
No. 1 .....lb.	.08	.09	.08	.09	.08	.11
No. 2 ..... lb.	.07	.08	.07	.08	.07	.09
Kauri, NY, San Francisco, Brown XXX, cases ....lb.	.60	.60½	.60	.60½	...	...
BX .....lb.	.33	.33½	.33	.33½	...	...
B1 .....lb.	.19	.19½	.19	.19½	...	...
B2 .....lb.	.14½	.15	.14½	.15	...	...
B3 .....lb.	.12	.12½	.12	.12½	...	...
Pale XXX .....lb.	.65	.65½	.65	.65½	...	...
No. 1 .....lb.	.40	.40½	.40	.40½	...	...
No. 2 .....lb.	.22	.22½	.22	.22½	...	...
No. 3 ..... lb.	.15	.15½	.15	.15½	...	...
Kino, tins .....lb.	.70	.80	.70	.80	.75	.80
Mastic .....lb.	.55	.55½	.46	.55½	.35	.55½
Sandarac, prime quality, 200 lb bgs & 300 lb cks ...lb.	.32½	.33	.32½	.35½	.35	.50
Senegal, picked bgs .....lb.	.20	.21	.20	.21	17	.21
Sorts ..... lb.	.11½	.12½	.09⅜	.12½	.08	.10
Thus, bbls .....280 lbs.	...	11.00	10.50	11.00	9.50	10.75
Strained .....280 lbs.	...	11.00	10.50	11.00	9.50	10.75
Tragacanth, No. 1, cases .....lb.	1.25	1.30	1.15	1.30	1.00	1.20
No. 2 .....lb.	1.15	1.20	1.05	1.20	...	...
No. 3 .....lb.	1.00	1.05	.95	1.05	...	...
No. 4 .....lb.	.90	.95	.85	.95	...	...
No. 5 .....lb.	.80	.85	.75	.85	...	...
No. 6, bgs .....lb.	.14	.15	.14	15	...	...
Sorts, bgs .....lb.	.11	.12	.11	.12	...	...
Yacca, bgs.....lb.	.03¼	.03¾	.03¼	.03¼	.03¼	.04

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Sodium Sulphide
Tartar Emetic
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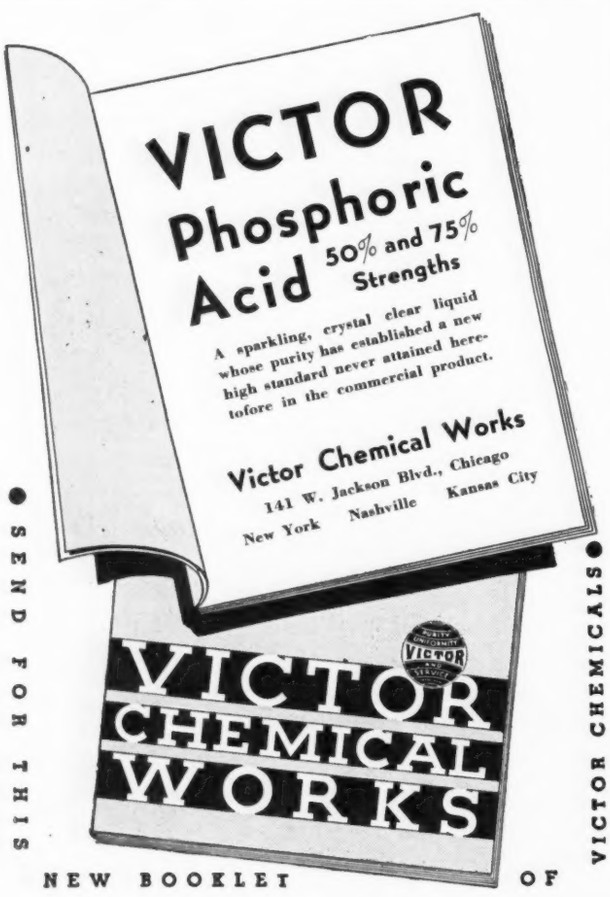
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● SEND FOR THIS NEW BOOKLET OF VICTOR CHEMICALS ●

Helium
Mercuric Chloride

Prices

	Current Market	1935 Low	1935 High	1934 Low	1934 High
Helium, cyl. (200 cu. ft.) cyl.	... 25.00	...	25.00	25.00	25.00
Hematite crystals, 400 lb bbls .....lb.	.16 .18	.16	.18	.16	.18
Paste, 500 bbls .....lb.	... .11	...	.11	...	.11
Hemlock 25%, 600 lb bbls wks .....lb.	... .02⅞	...	.02⅞	.02⅞	.04½
tks .....lb.	... .02½	...	.02½	...	...
Hexalene, 50 gal drs wks..lb.	... .30	...	.30	...	.30
Hexane, normal 60-70°C. Group 3, tks .....gal.	... .14	...	.14	...	.14
Hexamethylenetetramine, drs .....lb.	.37 .39	.37	.39	.37	.39
Hexyl Acetate, delv drs ...lb.	.12 .12½	.12	.12½	.12	.12½
tks .....lb.	... .11½	...	.11½	...	...
Hoof Meal, f.o.b. Chicago unit	... 2.50	2.50	2.70	1.85	2.70
South Amer. to arrive unit	... 1.85	...	1.85	1.65	1.80
Hydrogen Peroxide, 100 vol, 140 lb cbys .....lb.	.20 .21	.20	.21	.20	.21
Hydroxyamine Hydrochloride .....lb.	... 3.15	...	3.15	...	3.15
Hypernic, 51°, 600 lb bbls lb.	.17 .20	.17	.20	.17	.20
Indigo Madras, bbls .....lb.	1.25 1.30	1.25	1.30	1.25	1.30
20% paste, drs .....lb.	.15 .18	.15	.18	.15	.18
Synthetic, liquid .....lb.	... .12	...	.12	...	.12
Iodine, crude .....per kilo	... 15s 1d	...	15s 1d	...	15s 1d
Resublimed, kgs .....lb.	... 1.90	...	1.90	1.90	2.30
Irish Moss, ord, bales ....lb.	.09 .10	.09	.10	.07	.10
Bleached, prime, bales ..lb.	.18 .19	.18	.19	.14	.19
Iron Acetate Liq. 17°, bbls lb.	.03 .04	.03	.04	.03	.04
Chloride see Ferric Chloride.					
Nitrate, coml, bbls ..100 lb.	2.75 3.25	2.75	3.25	2.75	3.25
Oxide, English .....lb.	.07½ .08¾	.07½	.08¾	.07½	.09
Isobutyl Carbinol (128-132°C) drs, wks .....lb.	.33 .34	.33	.34	.34	.34
tks, wks .....lb.	... .32	...	.32	.32	.326
Isopropyl Acetate, tks ....lb.	... .07½	...	.07½	.07	.07½
drs, frt allowed .....lb.	.08½ .09	.08½	.09	...	...
Ether, see Ether, isopropyl.					
Keiselguhr, 95 lb bgs, NY, Brown .....ton	60.00 70.00	60.00	70.00	60.00	70.00
Lead Acetate, brown, broken, f.o.b. NY, bbls .....lb.	... .09½	...	.09½	.09½	.09½
White, broken, bbls ....lb.	... .11	...	.11	.11	.11
cryst bbls .....lb.	... .10½	...	.10½	.10½	.10½
gran, bbls .....lb.	... .11	...	.11	.11	.11
powd, bbls .....lb.	... .11¼	...	.11¼	.11¼	.11¼
Arsenate, East, jobbers, drs .....lb.	.09 .09½	.09	.09½	...	...
Dealers, drs .....lb.	.09¼ .10½	.09¼	.10½	...	...
West, jobbers, drs .....lb.	... .09	...	.09	...	...
dealers, drs .....lb.	... .10	...	.10	...	...
Linoleate, solid bbls .....lb.	.26 .26½	.26	.26½	.26	.26½
Metal, c-l, NY .....100 lb	... 3.75	3.50	3.75	3.50	4.25
Red, dry, 95% Pb_3O_4, delv .....lb.	.0615 .0775	.06	.0775	.06	.07¾
97% Pb_3O_4, delv .....lb.	.07 .08	.06¼	.08	...	...
98% Pb_3O_4, delv ....lb.	.0725 .07½	.06½	.0825	...	...
Nitrate, 500 lb bbls, wks..lb.	.10 .14	.10	.14	.10	.14
Oleate, bbls .....lb.	.15 .16	.15	.16	.15	.16
Resinate, precip, bbls ...lb.	... .14	...	.14	.14	.18½
Stearate, bbls .....lb.	.22 .23	.22	.23	.22	.23
White, 500 lb bbls, wks..lb.	.06½ .07	.06½	.07	.06½	.07
Sulfate, 500 lb bbls, wks lb.	... .06	...	.06	...	.06
Lime, chemical quicklime, f.o.b., wks, bulk .....ton	7.00 7.25	7.00	7.25	...	...
Hydrated, f.o.b., wks ..ton	8.50 12.00	8.50	12.00	...	...
Lime Salts, see Calcium Salts.					
Lime sulfur, sol, jobbers, tks .....gal.	... .10	...	.10	...	...
drs .....gal.	.13½ .15½	.13½	.15½	...	...
Dealers, tks .....gal.	... .10½	...	.10½	...	...
drs .....gal.	.14 .16½	.14	.16½	...	...
Linseed Meal, bgs .....ton	... 29.00	28.00	40.00	30.50	41.00
Litharge, coml, delv, bbls..lb.	.05⅞ .06¾	.05	.06¾	.051	.06¾
Lithopone, dom, ordinary, delv, bgs .....lb.	.04½ .04¾	.04½	.04¾	.04½	.04¾
bbls .....lb.	.04¾ .05	.04¾	.05	.04¾	.05
High strength, bgs .....lb.	.06 .06¼	.06	.06¼	.06	.06¼
bbls .....lb.	.06¼ .06½	.06¼	.06½	.06¼	.06½
Titanated, bgs .....lb.	.06 .06¼	.06	.06¼	.06	.06¼
bbls .....lb.	.06¼ .06½	.06¼	.06½	.06¼	.06½
Logwood, 51°, 600 lb bbls lb.	.08½ .10½	.08½	.10½	.08½	.12½
Solid, 50 lb boxes .....lb.	.13½ .17½	.13½	.17½	.13½	.17½
Sticks .....ton	24.00 26.00	24.00	26.00	24.00	26.00
Madder, Dutch .....lb.	.22 .25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbl ton	60.00 65.00	60.00	65.00	55.00	65.00
Magnesium Carb, tech, 70 lb bgs, wks .....lb.	.06 .06½	.06	.06½	.06	.06½
Chloride flake, 375 lb drs, c-l, wks .....ton	36.00 39.00	36.00	39.00	34.00	39.00
Magnesium fluosilicate, crys, 400 lb bbls, wks .... lb.	.10 .10½	.10	.10½	.10	.10½
Oxide, USP, light, 100 lb. bbls .....lb.	... .42	...	.42	...	.42
Heavy, 250 lb bbls ...lb.	... .50	...	.50	...	.50
Palmitate, bbls .....lb.	.23 .24	.22	.24	.21	.23
Stearate, bbls .....lb.	.20 .22	.19	.22	...	...
Linoleate, lig drs .....lb.	.18 .19	.18	.19	.18	.19
Resinate, fused, bbls ..lb.	.08¼ .08½	.08¼	.08½	.08¼	.08½
precip, bbls .....lb.	... .12	...	.12	.11½	.12½
Manganese Borate, 30%, 200 lb bbls .....lb.	.15 .16	.15	.16	.15	.16
Chloride, 600 lb cks ....lb.	.09 .12	.09	.12	.07	.12
Dioxide, tech (peroxide), drs .....lb.	.03¾ .06	.03¾	.06	.03¾	.06
Mangrove 55%, 400 lb bbls lb.	... .04	...	.04	...	.04
Bark, African .....ton	29.00 29.50	29.00	30.00	26.00	32.00
Marble Flour, blk .....ton	12.00 13.00	12.00	12.00	12.00	13.00
Mercuric chloride .....lb.	.71 .76	.71	.93	.73	.93

Current — Mercury Orthodichlorobenzene

	Current Market		1935 Low	1935 High	1934 Low	1934 High
Mercury metal ...76 lb. flasks	72.00	74.50	72.00	7650	66.50	79.00
Meta-nitro-aniline .....lb.	.67	.69	.67	.69	.67	.69
Meta-nitro-paratoluidine 200 lb bbls .....lb.	1.40	1.55	1.40	1.55	1.40	1.55
Meta-phenylene-diamine 300 lb bbls .....lb.	.80	.84	.80	.84	.80	.84
Peroxide, 100 lb cs ....lb.	1.20	1.25	1.20	1.25	1.20	1.25
Silicofluoride, bbls .....lb.	.09	.10	.09	.10	.09	.11
Stearate, bbls .....lb.	.19	.20	.19	.20	.19	.20
Meta-toluene-diamine, 300 lb bbls .....lb.	.67	.69	.67	.69	.67	.69
Methanol, 95%, frt allowed, drs .....gal. *o*	.37½	.58	.37½	.58	.37½	.58
tks, frt allowed ....gal. *o*	.33	.36½	.33	.36½	.33	.36½
97% frt allowed, drs gal. *o*	.38½	.59	.38½	.59	.38½	.59
tks, frt allowed ....gal. *o*	.34	.37½	.34	.37½	.34	.37½
Pure, frt allowed, drs gal. *o*	.40	.61	.40	.61	.40	.61
tks, frt allowed ....gal. *o*	.35½	.39	.35½	.39	.35½	.39
Synthetic, frt allowed, drs .....gal. *o*	.40	.61	.40	.61	.40	.61
tks, frt allowed ....gal. *o*	.35½	.39	.35½	.39	.35½	.39
Methyl Acetate, dom, 98-100%, drs .....lb.	.18	.18½	.18	.18½	.18	.18½
Synthetic, 410 lb drs .. lb.	.16	.17	.16	.17	.16	.17
tks .....lb.	...	.15	...	.15	.15	.15
Acetone, frt allowed, drs .....gal. *p*	.49½	.68½	.49½	.73½	...	...
tks, frt allowed, drs gal. *p*	.44	...	.44	.52½	...	...
Synthetic, frt allowed, east of Rocky M., drs gal. *p*	.57½	.60	.57½	.60	.57½	.60
tks, frt allowed	...	.53	...	.53	...	...
West of Rocky M., frt allowed, drs ....gal. *p*	.60	.63	.60	.63	...	...
tks, frt allowed ..gal. *p*	...	.56	...	.56	...	...
Hexyl Ketone, pure, drs lb.	...	.60	...	.60	.60	1.20
Anthraquinone .....lb.	.65	.67	.65	.67	.65	.67
Butyl Ketone, tks .....lb.	...	.10½	...	.10½	.10½	.10½
Chloride, 90 lb cyl .....lb.	...	.45	...	.45	.45	.45
Ethyl Ketone, tks .....lb.	...	.07½	...	.07½	.07½	.07½
Propyl carbinol, drs ...lb.	.60	.75	.60	.75	.60	.75
Mica, dry grd, bgs, wks ..lb.	35.00	...	35.00	...	...	...
Michler's Ketone, kgs ....lb.	...	2.50	...	2.50	...	2.50
Molasses, blackstrap, tks, f.o.b. NY .....gal.	.08	.08¼	.07¾	.08¼	.06	.09
Monoamylamine, drs, wks lb.	...	1.00	...	1.00	...	1.00
Monochlorobenzene, see Chlorobenzene, mono.						
Monoethanolamine, tks, wks lb.	...	.30	...	...	...	...
Monomethylparaminosulfate, 100 lb drs .....lb.	3.75	4.00	3.75	4.00	3.75	4.00
Myrobalans 25%, liq bbls..lb.	...	.04¼	...	.04¼	.03¾	.04¼
50% Solid, 50 lb boxes lb.	.06	.06¼	.06	.06¼	.06	.06¼
J1 bgs .....ton	...	23.25	23.50	27.00	24.50	32.00
J2 bgs .....ton	...	14.75	15.00	15.75	15.75	18.00
R2 bgs .....ton	...	14.50	16.00	16.50	16.25	18.00
Naphtha. v.m. & p. (deodorized) see petroleum solvents.						
Naphtha, Solvent, water-white, tks .....gal.	...	.30	.26	.30	.26	.30
drs, c-l .....gal.	...	.35	.31	.35	.31	.35
Naphthalene, dom, crude, bgs, wks .....lb.	1.65	2.40	1.65	2.40	...	...
Imported, cif, bgs ....lb.	...	1.90	...	1.90	1.75	1.90
Dyestuffs, bgs, bbls, Eastern wks .....lb.	.04¼	.04¾	.04¼	.04¾	...	...
Balls, ref'd, bbls, Eastern wks .....lb.	.04½	.05¼	.04½	.05¼	...	...
Flakes, ref'd, bbls, Eastern wks .....lb.	.04½	.05¼	.04½	.05¼	...	...
Dyestuffs, bgs, bbls, Mid-West wks .....lb. *q*	.04¾	.05¼	.04¾	.05¼	...	...
Balls, ref'd, bbls, Mid-West wks .....lb. *q*	.05	.05¾	.05	.05¾	...	...
Flakes, ref'd, bbls, Mid-West wks .....lb. *q*	.05	.05¾	.05	.05¾	...	...
Nickel Chloride, bbls .....lb.	.18	.19	.18	.19	.18	.19
Oxide, 100 lb kgs, NY..lb.	.35	.37	.35	.37	.35	.37
Salt, 400 lb bbls, NY ...lb.	.12½	.13	.12½	.13	.11½	.13
Single, 400 lb bbls, NY lb.	.11½	.12	.11½	.12	.11½	.12
Metal ingot .....lb.	...	.35	...	.35	.35	.35
Nicotine, free 50%, 8 lb tins, cases	8.25	10.15	8.25	10.15	8.25	10.15
Sulfate, 55 lb drs .....lb.	.77	.80	.67	.80	.67	.75
Nitre Cake, blk .....ton	12.00	14.00	12.00	14.00	12.00	14.00
Nitrobenzene, redistilled, 1000 lb drs, wks .....lb.	.09	.11	.09	.11	.09	.11
tks .....lb.	...	.08½	...	.08½	...	.08½
Nitrocellulose, c-l-l cl, wks lb.	.27	.34	.27	.34	.27	.34
Nitrogenous Mat'l, bgs, imp unit	...	2.25	2.25	2.75	...	...
dom, Eastern wks ....unit	...	2.25	2.25	2.40	2.35	3.25
dom, Western wks ....unit	...	1.90	1.90	2.30	...	...
Nitronaphthalene, 550 lb bbls lb.	.24	.25	.24	.25	.24	.25
Nutgalls Aleppy, bgs .....lb.	.19	.20	.19	.20	.18	.20
Chinese, bgs .....lb.	.19	.20	.19	.20	.17	.20
Oak Bark Extract, 25%, bbls lb.	...	.03½	...	.03½	.03⅜	.03½
tks .....lb.	...	.02¾	...	.02¾	...	...
Octyl Acetate, tks, wks ...lb.	...	.15	...	...	...	...
Orange-Mineral, 1100 lb cks NY .....lb.	.09¾	.10¼	.09¼	.10¼	.09¼	.10½
Orthoaminophenol, 50 lb kgs. lb.	2.15	2.25	2.15	2.25	2.15	2.25
Orthoanisidine, 100 lb drs lb.	.82	.84	.82	.84	.82	1.15
Orthochlorophenol, drs ....lb.	.50	.65	.50	.65	.50	.65
Orthocresol, drs .....lb.	.13	.15	.13	.15	.13	.15
Orthodichlorobenzene, 1000 lb drs .....lb.	.05½	.06	.05½	.06	.05½	.06

o Country is divided in 5 zones, prices varying by zone. In drum prices range covers both zone and c-l and lcl quantities in the 5 zones; in each case, bbl. prices are 2½c higher; synthetic is not shipped in bbls.; *p* Country is divided into 5 zones. Also see footnote directly above; *q* Naphthalene quoted on Pacific Coast F.A.S. Phila. or N. Y.

' ' ' Modern CHEMICAL Developments XVIII

38. BETTER TURPENTINE

Manufacturers and users of paints find that the new Hercules Steam-distilled Wood Turpentine has superior odor, solvent and leveling qualities, and is absolutely uniform.

39. FOR NEW TYPE LACQUER

The growing importance of lacquers made from nitrocellulose of the lower viscosities led to the development of commercial nitrocellulose — 18-25 centipoises viscosity, approximately half the viscosity of R. S. ¼ second.

40. FOR RECLAIMING RUBBER

Solvenol No. 1 is an excellent solvent and plasticizer for rubber. It is valuable for reclaiming rubber and as a solvent for finishes that contain rubber.

41. PROTECTION FOR STEEL AND IRON

Structural steel, sheets, bars, and tubes are made more resistant to the elements and chemical exposure by applying a coating made with Tornesit, the new chlorinated rubber ingredient for paint.

42. CLEAN DARK ROSINS

Users of dark rosins find in Vinsol Resin or in one of the seven grades of Hercules FF Wood Rosins, a uniformity and freedom from dirt, bark, and other foreign materials that is not obtainable in the ordinary rosins of commerce.

43. SUPERIOR ADHESIVES

Adhesives made with nitrocellulose are unusually satisfactory where great binding power, resistance to moisture, and flexibility are needed.

44. TEXTILE PROCESSING

When Yarmor Pine Oil is made soluble, it becomes a valuable aid to the textile-processing industry. It is efficient and economical in the production of cottons, woolens, worsteds, rayons, and silks.

45. ANTI-SKIN AGENT

Dipentene No. 122 has a uniform rate of evaporation that prevents skinning, wrinkling, and top drying in varnish and enamel films. It has an agreeable and familiar odor, and a drying rate consistent with other varnish thinners.

More detailed information on any of the above subjects can be secured by filling in this coupon.

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Ethyl Acetate
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Amyl Alcohol
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Butyl Propionate
Butyl Stearate
Phthalates:
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1227-29 E. Berks Street, Philadelphia, Pa.

Orthonitrochlorobenzene
Phloroglucinol

Prices

	Current Market	1935 Low	1935 High	1934 Low	1934 High
Orthonitrochlorobenzene, 1200 lb drs, wks ..... lb.	.28	.29	.28	.29	.28	.29
Orthonitrotoluene, 1000 lb drs, wks ..... lb.	.07	.10	.05½	.10	.05½	.06
Orthonitrophenol, 350 lb drs ..... lb.	.52	.80	.52	.80	.52	.80
Orthotoluidine, 350 lb bbls, l-c-l ..... lb.	.14½	.15	.14½	.15	.14	.15
Orthonitroparachlorphenol, tins ..... lb.	.70	.75	.70	.75	.70	.75
Osage Orange, cryst .... lb.	.17	.25	.17	.25	.16	.25
51 deg liquid ..... lb.	.07	.07¾	.07	.07¾	.07	.07¾
Powd, 100 lb bgs ..... lb.	.14½	.15	.14½	.15	.14½	.15
Paraffin, refd, 200 lb cs slabs						
122-127 deg M P ..... lb.	.04	.04¾	.04	.04¾	.04½	.04¾
128-132 deg M P ..... lb.	.05	.0515	.05	.0515	.04¾	.0515
133-137 deg M P ..... lb.	.0575	.06	.0575	.06	.05	.06
Para aldehyde, 110-55 gal drs ..... lb.	.16	.18	.16	.18	.16	.18
Aminoacetanilid, 100 lb kgs ..... lb.	...	.85	...	.85	.52	.85
Aminohydrochloride, 100 lb kgs ..... lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kgs lb.	...	1.05	..	1.05	.78	1.05
Chlorophenol, drs ..... lb.	.50	.65	.50	.65	.50	.65
Coumarone, 330 lb drs .. lb.	...	...	...	...	...	...
Cymene, refd, 110 gal dr ..... gal.	2.25	2.50	2.25	2.50	2.25	2.50
Dichlorobenzene 150 lb bbls wks ..... lb.	.16	.20	.16	.20	.16	.20
Nitroacetanilid, 300 lb bbls ..... lb.	.45	.52	.45	.52	.45	.52
Nitroaniline, 300 lb bbls, wks ... . lb.	.48	.55	.48	.55	.48	.55
Nitrochlorobenzene, 1200 lb drs, wks ..... lb.	.23½	.24	.23½	.24	.23½	.24
Nitro-orthotoluidine, 300 lb bbls ..... lb.	2.75	2.85	2.75	2.85	2.75	2.85
Nitrophenol, 185 lb bbls lb.	.45	.50	.45	.50	.45	.50
Nitrosodimethylaniline, 120 lb bbls ..... lb.	.92	.94	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls lb.	.35	.37	.35	.37	.35	.37
Phenylenedamine, 350 lb bbls ..... lb.	1.25	1.30	1.25	1.30	1.25	1.30
Para Tertiary amyl phenol, wks, drs ..... lb.	.32	.50	.32	.50	.32	.50
Toluenesulfonamide, 175 lb bbls ..... lb.	.70	.75	.70	.75	.70	.75
tks, wks ..... lbs.	...	.31	...	.31	...	...
Toluenesulfonchloride, 410 lb bbls, wks ..... lb.	.20	.22	.20	.22	.20	.22
Toluidine, 350 lb bbls, wks ..... lb.	.56	.60	.56	.60	.56	.60
Paris Green, Arsenic Basis						
100 lb kgs ..... lb.	...	.24	...	.24	.23	.24
250 lb kgs ..... lb.	...	.22	...	.22	...	.22
Perchlorethylene, 50 gal drs ..... lb.	...	.15	...	.15	...	.15
Persian Berry Ext, bbls .. lb.	.55	Nom.	.55	Nom.	.55	Nom.
Pentane, normal, 28-38°C, group 3 tks ..... gal.	...	.09	...	.09	.09	.09
drs, group 3 ..... gal.	.10	.15	.10	.15	...	...
Petrolatum, dark amber, bbls ..... lb.	.02	.02⅝	.02	.02⅞	...	...
Light, bbls ..... lb.	.02½	.02⅛	.02½	.03⅛	...	...
Medium, bbls ..... lb.	.02¼	.02¾	.02¼	.03	...	...
Dark green, bbls ..... lb.	.02½	.02 ¼	.02½	.02¾	...	...
White, lily, bbls ..... lb.	.05¼	.06¼	.05¼	.06½	...	...
White, snow, bbls ..... lb.	.06¼	.07¼	.06¼	.07½	...	...
Red, bbls ..... lb.	.02¼	.02½	.02¼	.02¾	...	...
Petroleum Ether, 30-60°, group 3, tks ..... gal.	...	.13	...	.13	.11	.13
drs, group 3 ..... gal.	.15	.16	.15	.16	.15	.17

PETROLEUM SOLVENTS AND DILUENTS

Cleaners naphthas, group 3, tks, wks ..... gal.	...	.06⅞	...	.06⅞	...	...
Bayonne, tks, wks .. gal.	...	.09	...	.09	...	...
West Coast, tks .... gal.	...	.15	...	.15	...	...
Hydrogenated naphthas, frt allowed East, tks ... gal.	...	.17½	...	.17½	...	...
No. 2, tks ..... gal.	...	.22½	...	.22½	...	...
No. 3, tks ..... gal.	...	.17½	...	.17½	...	...
No. 4, tks ..... gal.	...	.22½	...	.22½	...	...
Lacquer diluents, tks, Bayonne ..... gal.	.12	.12½	.12	.12½	.12	.12½
Group 3, tks ..... gal.	...	.07⅞	...	.07⅞	.06⅞	.08½
Naphtha, V.M.P., East, tks, wks ..... gal.	...	.09	...	.09	.09	.09½
Group 3, tks, wks .. gal.	...	.06⅞	...	.06⅞	.06¼	.07¼
Petroleum thinner, East, tks, wks ..... gal.	...	.09	...	.09	.09	.09
Group 3, tks, wks ... gal.	...	.05⅞	...	.05⅞	.05⅞	.06⅜
Rubber Solvents, stand grd, East, tks, wks ..... gal.	...	.09	...	.09	.09	.09½
Group 3, tks, wks .. gal.	...	.06⅞	...	.06⅞	.06⅜	.06⅞
Stoddard Solvent, East, tks, wks ..... gal.	...	.09	...	.09	.09	.09½
Group 3, tks, wks ... gal.	...	.06⅜	...	.06⅜	.05¾	.07⅛
Phenol, 250-100 lb drs .... lb.	.14¼	.15	.14¼	.15	.14¼	.15
Phenyl-Alpha-Naphthylamine, 100 lb kgs ..... lb.	...	1.35	...	1.35	...	1.35
Phenyl Chloride, drs .... lb.	...	.16	...	.16	...	.16
Phenylhydrazine Hydrochloride ..... lb.	2.90	3.00	2.90	3.00	2.90	3.00
Phloroglucinol, tech, tins .. lb.	15.00	16.50	15.00	16.50	15.00	16.50
CP, tins ..... lb.	20.00	22.00	20.00	22.00	20.00	22.00

Current — Phosphate Rock, Rosin Oil

	Current Market	1935 Low	1935 High	1934 Low	1934 High
Phosphate Rock, f.o.b. mines					
Florida Pebble, 68% basis ton	...	3.40	3.25	3.40	2.85	3.25
70% basis ton	..	3.90		3.90	3.35	3.90
72% basis ton	...	4.40	...	4.40	3.85	4.40
75-74% basis ton	...	5.40	...	5.40	4.90	5.40
75% basis ton	...	5.50	...	5.50	5.05	5.50
77-80% basis ton	...	6.50	...	6.50	5.90	6.50
Tennessee, 72% basis ..ton	...	4.75	...	4.75	4.75	5.00
Phosphorous Oxychloride 175 lb cyl lb.	.16	.20	.16	.20	.16	.20
Red, 110 lb cases lb.	.44	.45	.44	.45	.44	.45
Yellow, 110 lb cs, wks..lb.	.28	.33	.28	.33	.28	.33
Sesquisulfide, 100 lb cs..lb.	.38	.44	.38	.44	.38	.44
Trichloride, cyl lb.	.16	.20	.16	.20	.16	.20
Phthalic Anhydride, 100 lb drs, wks lb.	.14½	.15½	.14½	.15½	.14½	.15½
Pine Oil, 55 gal drs or bbls						
Destructive dist lb.	.44	.46	.44	.50	.48	.62
Steam dist wat wh bbls gal.	.64	.65	.64	.65	.64	.65
tks gal.	...	.59	...	.59	...	...
Straw color, bbls gal.	...	.59	...	.59	...	...
tks gal.	...	.54	...	.54	...	...
Pitch Hardwood, wks ....ton	...	15.00	15.00	20.00	...	20.00
Burgundy, dom, bbls, wks lb.	...	.03½	...	.03½	...	...
Imported lb.	.11	.13	.11	.13	...	...
Coaltar, bbls, wks .....ton	...	19.00	...	19.00	...	...
Petroleum, see Asphaltum in Gums' Section.						
Pine, bbls .....bbl.	3.75	4.25	3.75	4.25	...	...
Stearin, drs .....lb.	.03	.04½	.03	.04½	...	...
Platinum, refd .....oz.	35.00	36.00	35.00	36.00	35.00	38.00

POTASH

Potash, Caustic, wks, sol..lb.	.06¼	.06½	.06¼	.06½	.06¼	.07⅜
flake lb.	.07	.07⅜	.07	.07⅜	.07	.08¼
Liquid tks lb.	...	.02⅞	...	.02⅞	.02⅞	.03⅛
Potash Salts, Rough Kainit 14% basis ton	...	8.50	...	8.50	8.50	9.70
Manure Salts, imported						
20% basis, blk ton	...	10.00	8.60	10.00	8.60	12.00
30% basis, blk ton	...	12.90	..	12.90	12.90	19.15
Domestic, cif ports, blk unit	...	.43	...	.43	...	...
Potassium Acetate lb.	.26	.28	.26	.28	.26	.28
Potassium Muriate, 80% basis bgs ton	...	22.00	...	22.00	22.00	37.15
Dom, blk unit	...	.40	...	.40	...	...
Pot & Mag Sulfate, 48% basis bgs ton	...	19.75	19.75	22.50	22.50	25.00
Potassium Sulfate, 90% basis bgs ton	...	29.85	29.85	35.00	35.00	42.15
Potassium Bicarbonate, USP 320 lb bbls lb.	.07½	.09	.07½	.09	.07½	.09
Bichromate Crystals, 725 lb cks lb.	.08⅛	.08⅝	.08⅛	.08⅝	.08⅛	.08⅝
Binoxalate, 300 lb bbls..lb.	.22	.23	.22	.23	.14	.23
Bisulfate, 100 lb kgs ..lb.	.35	.36	.35	.36	.33	.36
Carbonate, 80-85% calc 800 lb cks lb.	.07½	.07⅞	.07½	.07⅞	.07	.07⅞
liquid, tks lb.	...	...	...	...	...	...
drs, wks lb.	...	...	...	...	...	...
Chlorate crys, powd, 112 lb kgs, wks lb.	...	.09¾	...	.09¾	.08½	.09¾
gran, kgs lb.	.12	.13	.12	.13	...	...
powd, kgs lb.	.08¾	.09¾	.08¾	.09¾	...	...
Chloride, crys, bbls ....lb.	.04	.04¾	.04	.04¾	.04	.04¾
Chromate, kgs lb.	.23	.28	.23	.28	.23	.28
Cyanide, 110 lb cases ..lb.	.55	.57½	.55	.57½	.55	.60
Iodide, 75 lb bbls lb.	...	1.40	...	1.40	1.40	2.70
Metabisulfite, 300 lb bbls lb.	...	.15	...	.15	.10½	.15
Oxalate, bbls lb.	.16	.24	.16	.24	.16	.24
Perchlorate, cks, wks .. lb.	.09	.11	.09	.11	.09	.11
Permanganate, USP, crys, 500 & 1000 lb drs, wks lb.	.18½	.19½	.18½	.19½	.18½	.19½
Prussiate, red, 112 lb kgs lb.	.35	.38½	.35	.38½	.35	.39
Yellow, 500 lb casks ..lb.	.18	.19	.18	.19	.18	.19
Tartrate Neut, 100 lb kgs lb.	...	.21	...	.21	...	.21
Titanium Oxalate, 200 lb bbls lb.	.32	.35	.32	.35	.32	.35
Propane, group 3, tks	...	.07	...	.07	...	.07
Pumice Stone, lump bgs ..lb.	.04½	.06	.04½	.06	.04½	.06
250 lb bbls lb.	.05	.07	.05	.07	.05	.07
Powd, 350 lb bgs lb.	.02½	.03	.02½	.03	.02½	.03
Putty, coml, tubs .....100 lb.	...	2.75	...	2.75	2.25	2.75
Linseed Oil, kgs ...100 lb.	...	4.50	...	4.50	4.00	4.50
Pyridine, 50 gal drs .....gal.	...	1.25	...	1.25	...	1.25
Pyrites, Spanish cif Atlantic ports, blk unit	.12	.13	.12	.13	.12	.13
Pyrocatechin, CP, drs, tins lb.	2.75	3.00	2.75	3.00	2.75	3.00
Quebracho, 35% liq tks ...lb.	...	.02⅝	...	.02⅝	.02¼	.02⅝
450 lb bbls, c-l lb.	...	.03⅛	...	.03⅛	.02¾	.03⅛
Solid, 63%, 100 lb bales cif lb.	...	.03⅝	...	.03⅝	.02⅞	.03⅝
Clarified, 64%, bales..lb.	...	.03⅞	...	.03⅞	.03	.03⅞
Quercitron, 51 deg liq, 450 lb bbls lb.	.06	.06½	.06	.06½	.05½	.06½
Solid, 100 lb boxes .....lb.	.10	.12	.10	.12	.09½	.13
R Salt, 250 lb bbls, wks ..lb.	.44	.45	.44	.45	.40	.45
Resorcinol tech, cans .....lb.	.75	.80	.75	.80	.65	.80
Rochelle Salt, cryst .....lb.	.14	.14½	.14	.15	.12½	.16
Powd, bbls lb.	.13	.13½	.13	.13½	...	...
Rosin Oil, bbls, first run gal.	...	.38	.36	.45	.45	.48
Second run gal.	...	.45	.43	.48	.48	.53
Third run, drs gal.	...	.53	.50	.60	...	...

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Rosins
Sodium Nitrate

Prices

		Current Market	1935 Low	1935 High	1934 Low	1934 High
Rosins 600 lb bbls, 280 lb unit ex. yard NY:						
B	..	4.70	4.65	5.25	4.50	5.75
D	..	5.07½	5.02½	5.25	4.60	5.85
E	..	5.27½	5.22½	5.45	4.80	6.50
F	...	5.55	5.35	5.90	5.00	6.75
G	...	5.72½	5.45	5.95	5.05	6.75
H	...	5.72½	5.50	5.97½	5.10	6.75
I	...	5.72½	5.55	6.00	6.75	4.05
K	..	5.77½	5.60	6.00	5.30	6.75
M	...	5.80	5.65	6.02½	5.45	6.80
N	...	6.20	5.75	6.40	5.50	6.80
WG	...	6.52½	6.05	6.87½	5.70	6.80
WW	...	7.50	6.40	7.55	5.90	6.85
Rosins, Gum, Savannah (280 lb unit):						
B	..	3.40	3.40	4.00	...	...
D	...	3.80	3.75	4.20	...	...
E	...	4.00	3.90	4.20	...	...
F	4.25	4.30	4.15	4.65	...	...
G	..	4.45	4.25	4.70	...	...
H	...	4.45	4.30	4.75	...	...
I	...	4.45	4.35	4.75	...	...
K	...	4.50	4.35	4.75	...	...
M	4.50	4.55	4.35	4.75	...	...
N	4.90	4.95	4.50	5.15	...	...
WG	...	5.25	4.80	5.60	...	...
WW	...	6.20	5.25	6.25	...	...
X	...	6.25	5.25	6.25	...	...
Rosins, Wood, wks (280 lb unit), FF	5.20	6.10	4.30	6.35	...	...
I	5.85	6.75	4.65	7.00	...	...
M	6.35	7.25	5.00	7.25	...	...
N	6.85	7.75	5.40	7.75	...	...
Rosin, Wood, c-l, FF grade, NY	...	5.20	5.10	5.30	5.10	6.13
Rotten Stone, bgs mines ..ton	23.50	24.00	23.50	24.00	23.50	24.00
Lump, imported, bbls ..lb.	.05	.07	.05	.07	.05	.07
Selected, bbls .....lb.	.08	.10	.08	.10	.08	.12
Powdered, bbls .....lb.	.02½	.05	.02½	.05	.02½	.05
Sago Flour, 150 lb bgs ....lb.	.02¼	.03¾	.02¾	.03¾	.02½	.03¾
Sal Soda, bbls, wks ..100 lb.	...	1.30	...	1.30	1.10	1.30
Salt Cake, 94-96%, c-l, wks .....ton	13.00	18.00	13.00	18.00	13.00	18.00
Chrome, c-l, wks .....ton	12.00	13.00	12.00	13.00	12.00	13.00
Saltpetre, double refd, gran, 450-500 lb bbls .....lb.	.059	.06¼	.059	.06¼	.059	.06¼
Powd, bbls .....lb.	.069	.07⅞	.069	.07⅞	...	...
Cryst, bbls .....lb.	.069	.08	.069	.08	...	...
Satin, White, 550 lb bbls ..lb.	...	.01½	...	.01½	...	.01½
Shellac, Bone dry, bbls ..lb. *r*	.20	.22	.19	.32	.26	.37
Garnet, bgs .....lb.	.17	.19	.17	.27	.26	.32
Superfine, bgs .....lb. *s*	.17	.18	.16	.28	.23	.31
T. N., bgs .....lb. *s*	.14	.15	.13	.25	...	...
Schaeffer's Salt, kgs .....lb.	.48	.50	.48	.50	.48	.50
Silver Nitrate, vials .....oz.	...	.51	.38	.53¾	.31⅞	.40½
Slate Flour, bgs, wks ....ton	9.00	10.00	9.00	10.00	9.00	10.00
Soda Ash, 58% dense, bgs, c-l, wks .....100 lb.	...	1.25	...	1.25	...	1.25
58% light, bgs .....100 lb.	...	1.23	...	1.23	...	1.25
blk .....100 lb.	...	1.05	...	1.05	...	1.05
paper bgs .....100 lb.	...	1.20	...	1.20	...	1.20
bbls .....100 lb.	...	1.50	...	1.50	...	1.50
Soda Caustic, 76% grnd & flake, drs .....100 lb.	..	3.00	...	3.00	...	3.00
76% solid, drs .....100 lb.	...	2.60	...	2.60	...	2.60
Liquid sellers, tks, 100 lbs.	...	2.25	...	2.25	...	2.25
Sodium Abietate, drs .....lb.	...	.08	...	.08	.03	.08
Acetate, tech, 450 lb bbls, wks .....lb.	.04½	.05	.04½	.05	.04½	.05
Alignate, drs .....lb.	...	.64	...	.64	.50	.64
Arsenate, drs .....lb.	...	.10½	...	.10½	.07¾	.10½
Arsenite, liq, drs .....gal.	.40	.75	.40	.75	.40	.75
Benzoate, USP, kgs .. lb.	.46	.48	.46	.48	.45	.48
Bicarb, 400 lb bbl, wks 100 lb.	...	1.85	...	1.85	1.85	1.85
Bichromate, 500 lb cks, wks .....lb.	.06⅛	.06⅝	.06⅛	.06⅝	.06⅛	.06⅝
Bisulfite, 500 lb bbl, wks lb.	.03¼	.036	.03¼	.036	.03	.036
35-40% sol cbys, wks 100 lb.	1.95	2.10	1.95	2.10	...	...
Chlorate, bgs, wks .....lb.	.06¼	.07½	.06¼	.07½	.06¼	.07½
Chloride, tech .....ton	13.60	16.50	13.60	16.50	11.40	16.50
Cyanide, 96-98%, 100 & 250 lb drs, wks .....lb.	.15½	.17½	.15½	.17½	.15½	.17½
Fluoride, 90%, 300 lb bbls, wks .....lb.	.07¼	.08¼	.07¼	.08¼	.07¼	.09½
Hydrosulfite, 200 lb bbls, f.o.b. wks .....lb.	.18	.19	.18	.21	.19½	.21
Hyposulfite, tech, pea crys 375 lb bbls, wks 100 lb.	2.50	3.00	2.50	3.00	2.40	3.00
Tech, reg cryst, 375 lb bbls, wks .....100 lb.	2.40	2.75	2.40	2.75	2.40	2.75
Iodide .....lb.	...	2.40	...	2.40	2.40	3.50
Metanilate, 150 lb bbls ..lb.	.41	.42	.41	.42	.41	.42
Metasilicate, gran, c-l, wks .....100 lb.	2.65	3.05	2.65	3.05	2.65	3.05
cryst, bbls, wks ..100 lb.	...	3.25	...	3.25	...	3.25
Monohydrate, bbls .....lb.	...	.02½	...	.02½	...	.02½
Napthenate, drs .....lb.	...	.09	...	.09	.09	.13
Naphthionate, 300 lb bbl lb.	.52	.54	.52	.54	.52	.54
Nitrate, 92%, crude, 200 lb bgs, c-l, NY .....ton	...	24.80	...	24.80	24.80	26.30
100 lb bgs .....ton	...	25.50	...	25.50	25.50	27.00
Bulk .....ton	...	23.50	...	23.50	23.50	24.50

r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 3c; Philadelphia deliveries f.o.b. N. Y.; refined 6c higher in each case; *s* T. N. and Superfine prices quoted f.o.b. N. Y. and Boston; Chicago prices 1c higher; Pacific Coast 3c; Philadelphia f.o.b. N. Y.

	Current Market		1935 Low	1935 High	1934 Low	1934 High
Sodium (continued)						
Nitrite, 500 lb bbls ....lb.	.07¼	.08	.07¼	.08	.07¼	.08
Orthochlorotoluene, sulfonate, 175 lb bbls, wks lb.	.25	.27	.25	.27	.25	.27
Perborate, 275 lb bbls ..lb.	.17	.18	.17	.19	.18	.19
Peroxide, bbls, 400 lb ..lb.	..	.17	...	.17	...	.17
Phosphate, di-sodium, tech, 310 lb bbls, wks 100 lb.	...	2 30	2.20	2.30	2.10	2.40
bgs, wks .....100 lb.	...	2.10	2.00	2.10	...	..
tri-sodium, tech, 325 lb bbls, wks .....100 lb.	...	2.70	2.60	2.70	2.60	2.70
bgs, wks .....100 lb.	..	2.50	2.50	2.60	...	...
Picramate, 160 lb kgs ..lb.	.67	.69	.67	.69	.69	.72
Prussiate, Yellow, 350 lb bbl, wks .....lb.	.11½	.12	.11½	.12	.11½	.12
Pyrophosphate, anhyd, 100 lb bbls .. ..lb.	.102	.132	.102	.15	...	.15
Silicate, 60°, 55 gal drs, wks .....100 lb.	1.65	1.70	1.65	1.70	1.65	1.70
40°, 35 gal drs, wks 100 lb.	...	.80	...	.80	...	.80
tks, wks .....100 lb.	...	.65	...	.65	...	.65
Silicofluoride, 450 lb bbls NY .....lb.	.04¼	.04½	.04¼	.04¾	.04¾	.06
Stannate, 100 lb drs ....lb.	.33	.34	.31	.37	.33½	.37½
Stearate, bbls .....lb.	.20	.25	.20	.25	.20	.25
Sulfanilate, 400 lb bbls..lb.	.16	.18	.16	.18	.16	.18
Sulfate Anhyd, 550 lb bbls c-l, wks .....100 lb. †	1.30	1.55	1.25	2.35	2.20	2.85
Sulfide, 80% cryst, 440 lb bbls, wks .....lb.	...	.02¼	...	.02¼	.02¼	.02½
62% solid, 650 lb drs, c-l, wks .....lb.	...	.03	...	.03	...	.03
Sulfite, cryst, 400 lb bbls, wks .....lb.	.023	.02½	.023	.02½	.02¼	.02½
Sulfocyanide, bbls .. ..lb.	.32	.42½	.32	.42½	.28	.42½
Tungstate, tech, crys, kgs .....lb.	...	.90	...	.90	.70	.90
Spruce Extract, ord, tks ..lb.	...	.01	...	.01	...	.01
Ordinary, bbls .....lb.	...	.01½	...	.01½	...	.01½
Super spruce ext, tks .. lb.	...	.01⅝	...	.01⅝	...	.01⅜
Super spruce ext, bbls ..lb.	...	.01⅞	...	.01⅞	...	.01⅞
Super spruce ext, powd, bgs .....lb.	...	.04	...	.04	...	.04
Starch, Pearl, 140 lb bgs .....100 lb.	3.58	3.78	3.36	3.78	2.81	3.76
Powd, 140 lb bgs ...100 lb.	3.68	3.88	3.46	3.66	2.71	3.66
Potato, 200 lb bgs .....lb.	.04½	.05½	.04½	.06	.05¼	.06
Imp, bgs .....lb.	.05¾	.06	.05¾	.06½	.06	.06½
Rice, 200 lb bbls .....lb.	...	.07¼	.07¼	.08½	.07½	.08½
Wheat, thick bgs .....lb.	...	.08¼	...	.08¼	.06¼	.08¼
Strontium carbonate, 600 lb. bbls, wks .....lb.	.07¼	.07½	.07¼	.07½	.07¼	.07½
Nitrate, 600 lb bbls, NY .....lb.	.08¾	.09½	.08¾	.09½	.08¾	.11
Sulfur	...	...	...	...	...	...
Crude, f.o.b. mines ....ton	18.00	19.00	18.00	19.00	18.00	19.00
Flour, coml, bgs ....100 lb.	1.60	2.35	1.60	2.35	1.60	2.35
bbls .....100 lb.	1.95	2.70	1.95	2.70	1.95	2.70
Rubbermakers, bgs ..100 lb.	2.20	2.80	2.20	2.80	2.20	2.80
bbls .....100 lb.	2.55	3.15	2.55	3.15	2.55	3.15
Extra fine, bgs .....100 lb.	2.40	3.00	2.40	3.00	2.40	3.00
Superfine, bgs .....100 lb.	2.20	2.80	2.20	2.80	2.20	2.80
bbls .....100 lb.	2.25	3.10	2.25	3.10	2.25	3.10
Flowers, bgs .....100 lb.	3.00	3.75	3.00	3.75	3.00	3.75
bbls .....100 lb.	3.35	4.10	3.35	4.10	3.35	4.10
Roll, bgs .....100 lb.	2.35	3.10	2.35	3.10	2.35	3.10
bbls .....100 lb.	2.50	3.25	2.50	3.25	2.50	3.25
Sulfur Chloride, red, 700 lb drs, wks .....lb.	.05	.05½	.05	.05½	.05	.05½
Yellow, 700 lb drs, wks lb.	.03½	.04½	.03½	.04½	.03½	.04½
Sulfur Dioxide, 150 lb cyl lb.	.08½	.10	.08½	.10	.07	.10
Multiple units, wks ... lb.	...	.06½	...	.06½	...	...
tks, wks .....lb.	...	.04¾	...	.04¾	...	...
Refrigeration, cyl, wks ...lb.	...	.13	...	.13	...	...
Multiple units, wks ....lb.	...	.09¼	...	.09¼	...	...
Sulfuryl Chloride .....lb.	.15	.40	.15	.40	.15	.40
Sumac, Italian, grd .....ton	60.00	62.00	59.00	62.00	58.00	75.00
dom, bgs, wks .....ton	..	35.00	...	35.00	...	...
Superphosphate, 16% bulk, wks .....ton	...	8.50	...	8.50	8.00	8.50
Run of pile .....ton	...	8.00	...	8.00	7.50	8.00
Talc, Crude, 100 lb bgs, NY .....ton	14.00	15.00	14.00	15.00	12.00	15.00
Refd, 100 lb bgs, NY ton	16.00	18.00	16.00	18.00	16.00	18.00
French, 220 lb bgs, NY ton	22.00	30.00	22.00	30.00	27.50	30.00
Refd, white, bgs .....ton	45.00	60.00	45.00	60.00	45.00	60.00
Italian, 220 lb bgs to arr ton	70.00	75 00	70.00	75.00	70.00	75.00
Refd, white, bgs, NY ton	75.00	80.00	75.00	80.00	75.00	80.00
Tankage Grd, NY ....unit ¤	...	2.60	2.60	2.75	2.50	3.25
Ungrd .....unit ¤	...	2.35	2.35	2.50	2.00	2.75
Fert grade, f.o.b. Chicago .....unit ¤	...	2.30	2.30	2.60	1.80	2.40
South American cif..unit ¤	...	2.75	2.75	3.15	2.75	3.10
Tapioca Flour, high grade, bgs .....lb.	.0215	.05	.0215	.05	.0215	.05
Tar Acid Oil, 15%, drs gal.	.21	.22	.21	.22	.21	.22
25%, drs .....gal.	.23	.24	.23	.24	.23	.24
Tar, pine, delv, drs .....gal.	.25	.26	.25	.26	...	...
tks, delv .....gal.	...	.20	...	.20	...	...
Tartar Emetic, tech .....lb.	.22¾	.23	.22¾	.23	.23	.23
USP, bbls .....lb.	.28	.28½	.28	.28½	.27	.28½
Terpineol, den grd, drs ...lb.	.13¾	.14¾	.13¾	.14¾	...	...
tks .....lb.	.13	.14	.13	.14	...	...
Tetrachlorethane, 50 gal drs lb.	.08½	.09	.08½	.09	.08½	.09
Tetralene, 50 gal drs, wks lb.	.12	.13	.12	.13	.12	.13
Thiocarbanilid, 170 lb bbl lb.	.20	.25	.20	.25	.20	.25

† Bags 15c lower; ¤ + 10.

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Tin Crystals
Zinc Stearate

Prices

		Current Market	1935 Low	1935 High	1934 Low	1934 High
Tin, crystals, 500 lb bbls, wks	lb.	.39	.39½	.36	.39½	.30	.40½
Metal, NY	lb.	...	.52	.456	.52	.50⅞	.55⅜
Oxide, 300 lb bbls, wks	lb.	.53	.55	.51	.58	.55	.60
Tetrachloride, 100 lb drs, wks	lb.	...	.26½	.24¾	.26½	.25½	.28½
Titanium Dioxide, 300 lb bbls	lb.	.17¼	.19¼	.17¼	.19¼	.17¼	.19¼
Barium Pigment, bbls	lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
Calcium Pigment, bbls	lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
Toluol, 110 gal drs, wks	gal.	...	.35	...	.35	...	.35
8000 gal tks, frt allowed	gal.	...	.30	...	.30	...	.30
Toluidine, mixed, 900 lb drs, wks	lb.	.27	.28	.27	.28	.27	.28
Toner Lithol, red, bbls	lb.	.75	.80	.75	.80	.75	.85
Para, red, bbls	lb.	...	.75	...	.75	.75	.80
Toluidine, bgs	lb.	...	1.35	...	1.35	...	1.35
Triacetin, 50 gal drs, wks	lb.	.32	.36	.32	.36	.32	.36
Triamyl Borate, drs, wks	lb.	...	.40	...	.40	...	.40
Triamylamine, drs, wks	lb.	...	1.25	...	1.25	1.00	1.25
Trichlorethylene, 50 gal drs	lb.	.09½	.10	.09½	.10	.09½	.10
Triethanolamine, 50 gal drs wks	lb.	.26	.30	.26	.38	.35	.38
tks, wks	lb.	...	.25	...	...	...	...
Tricresyl Phosphate, drs	lb.	.21	.23	.21	.23	.19	.26
Triphenyl Guanidine	lb.	.58	.60	.58	.60	.58	.60
Tripoli, airfloated, bgs, wks	ton	27.50	30.00	27.50	30.00	...	...
Tungsten, Wolframite per unit		15.00	15.25	15.00	15.25	12.00	15.25
Turpentine (Spirits), c-l, NY dock, bbls	gal.	...	.50¼	.49¾	.55½	.46¼	.63½
Savannah, bbls	gal.	.45½	.45¾	.45	.50¼	.41¼	.58½
Jacksonville, bbls	gal.	...	.45¾*	.45	.50¼	.41¼	.58½
Wood Steam dist, bbls, c-l, NY	gal.	...	.47	.45	.49	.41	.61
Urea, pure, 112 lb cases	lb.	.15½	.17	.15½	.17	.15	.17
Fert grade, bgs c.i.f.	ton	100.00	120.00	100.00	120.00	90.00	120.00
c.i.f. S.A. points	ton	100.00	120.00	100.00	120.00	90.00	120.00
Urea Ammonia liq 55% NH_3, tks	unit	...	.96	...	.96	...	.96
Valonia beard, 42%, tannin bgs	ton	41.00	42.00	41.00	43.50	39.00	48.00
Cups, 32% tannin, bgs	ton	26.00	26.50	26.00	28.50	23.00	32.50
Mixture, bark, bgs	ton	...	32.00	...	32.00	..	32.00
Vermillion, English, kgs	lb.	1.56	1.70	1.56	1.70	1.41	1.73
Vinyl Chloride, 16 lb cyl	lb.	...	1.00	...	1.00	...	1.00
Wattle Bark, bgs	ton	...	30.00	29.25	32.00	29.50	34.00
Extract, 60°, tks, bbls	lb.	...	.03¾	...	.03¾	.03⅜	.03⅞

WAXES

Wax, Bayberry, bgs	lb.	.22	.23	.22	.23	.25	.30
Bees, bleached, white 500 lb slabs, cases	lb.	.33½	.34	.33½	.34	.32	.37
Yellow, African, bgs	lb.	.22	.23	.21	.23	.16	.22
Brazilian, bgs	lb.	.21½	.23½	.21½	.25	...	...
Chilean, bgs	lb.	.21½	.23½	.21½	.24½	...	...
Refined, 500 lb slabs, cases	lb.	.27½	.28	.27½	.28	.21	.29
Candelilla, bgs	lb.	.11	.12¼	.10	.12½	.10¼	.14½
Carnauba, No. 1, yellow, bgs	lb.	.38½	.42	.35	.42	.30	.40
No. 2, yellow, bgs	lb.	.38½	.40	.34	.40	.34	.41
No. 2, N. C., bgs	lb.	.33	.34	.26½	.34	.20	.29
No. 3, Chalky, bgs	lb.	.31	.32	.21	.32	...	...
No. 3, N. C., bgs	lb.	.31	.33	.22½	.33	.16¼	.25
Ceresin, white, imp, bgs	lb.	.43	.45	.43	.45	...	...
Yellow, bgs	lb.	.36	.38	.36	.38	...	...
Domestic, bgs	lb.	.08	.11	.08	.11	...	...
Japan, 224 lb cases	lb.	.07¼	.07¾	.06	.07¾	.06	.07½
Montan, crude, bgs	lb.	.10½	.11½	.10½	.11½	.10	.11
Paraffin, see Paraffin Wax.							
Spermaceti, blocks, cases	lb.	.22	.24	.19	.24	.18	.20
Cakes, cases	lb.	.23	.25	.20	.25	.19	.21
Whiting, prec 200 lb bgs, c-l, wks	ton	...	15.00	12.00	15.00	...	...
Alba, bgs, c-l, NY	ton	...	15.00	...	15.00	...	15.00
Gliders, bgs, c-l, NY	ton	...	15.00	...	15.00	...	...
Wood Flour, c-l, bgs	ton	18.00	30.00	18.00	30.00	18.00	30.00
Xylol, frt allowed, East 10° tks, wks	gal.	.31	.33	.27	.33	.27	.29
Coml, tks, wks, frt allowed	gal.	...	.30	.26	.30	...	.26
Xylidine, mixed crude, drs	lb.	.36	.37	.36	.37	.36	.37
Zinc, Carbonate tech, bbls, NY	lb.	.09½	.11	.09½	.11	.09½	.11
Chloride fused, 600 lb drs, wks	lb.	.04½	.05¾	.04½	.05¾	.04¼	.05¼
Gran, 500 lb bbls, wks	lb.	.05	.05¾	.05	.05¾	.05⅛	.06
Soln 50%, tks, wks	100 lb.	...	2.00	...	2.00	...	2.00
Cyanide, 100 lb drs	lb.	.36	.41	.36	.41	.36	.41
Zinc Dust, 500 lb bbls, c-l, delv	lb.	...	.063	.057	.063	.0567½	.071
Metal, high grade slabs, c-l, NY	100 lb.	...	4.45	4.05	4.45	4.05	4.75
E. St. Louis	100 lb.	...	4.10	3.70	4.10	3.70	4.46
Oxide, Amer, bgs, wks	lb.	.05¾	.06¼	.05¾	.06¼	.05¾	.06¼
French, 300 lb bbls, wks	lb.	.06½	.10⅞	.06½	.10⅞	.05¾	.11⅛
Palmitate, bbls	lb.	.22	.23	.21	.23	.20	.22
Perborate, 100 lb drs	lb.	...	1.25	...	1.25	...	1.25
Peroxide, 100 lb drs	lb.	...	1.25	...	1.25	...	1.25
Resinate, fused, dark, bbls	lb.	.05¾	.06½	.05¾	.06½	.05¾	.06½
Stearate, 50 lb bbls	lb.	.19	.22	.18	.22	.18	.21

* Bid and refused.

Current

Zinc Sulfate
Oil, Whale

	Current Market		1935 Low	1935 High	1934 Low	1934 High
Zinc Sulfate, crys, 400 lb bbl, wks	lb.	.028	.033	.028	.033	.02¾	.033
Flake, bbls	lb.	.035	.032	.035	.032	...	...
Sulfide, 500 lb bbls, delv	lb.	.10¾	.11¾	.10¾	.11¾	.10¾	.13½
bgs, delv	lb.	.10½	.11½	.10½	.11½	...	...
Sulfocarbolate, 100 lb kgs	lb.	.24	.25	.24	.25	.21	.25
Zirconium Oxide, Nat kgs	lb.	.02½	.03	.02½	.03	.02½	.03
Pure, kgs	lb.	.45	.50	.45	.50	.45	.50
Semi-refined, kgs	lb.	.08	.10	.08	.10	.08	.10

Oils and Fats

Castor, No. 3, 400 lb bbls.	lb.	.09¾	.10½	.09¾	.10½	.09¾	.10½
Blown, 400 lb bbls	lb.	.11½	.12¼	.11½	.16	.11½	12¾
China Wood, bbls spot NY	lb.	.18	Nom.	.094	.18	.07½	.099
Tks, spot NY	lb.	.15	.15½	.088	.15½	.07¼	.094
Coast, tks	lb.	...	.14¾	.087	.14¾	.06⅞	.094
Coconut, edible, bbls NY	lb.	...	.11¼	.04	.12	.04¾	.10¾
Manila, bbls NY	lb.	...	.05⅞	.04¾	.06	.03¾	.04¾
Tks, NY	lb.	...	.05¼	.03¾	.06¼	.02⅝	.03¾
Tks, Pacific Coast	lb.	...	.04¾	.03½	.06	.02¼	.02½
Cod, Newfoundland, 50 gal bbls	gal.	.35	.36	.36	.38	.34	.40
Copra, bgs, NY	lb.	...	.0275	.02	.038	.0012	.021
Corn, crude, bbls, NY	lb.	...	.09½	.09½	.12½	.04⅝	.10½
Tks, mills	lb.	.09	.09¼	.09	.11	.03½	.09½
Refd, 375 lb bbls, NY	lb.	.11¾	.12	.11¾	.14	.05¾	.12
Cottonseed, see Oils and Fats News Section.							
Degras, American, 50 gal bbls, NY	lb.	.05¼	.06¾	.04½	.06	.02¾	.05½
English, brown, bbls, NY	lb.	.04¾	.05½	.04¾	.06½	.03¾	.05⅜
Greases, Yellow	lb.	.06⅝	.06¾	.05	.06⅝	.02⅜	.05⅛
White, choice bbls, NY	lb.	.07⅜	.08½	.05¼	.08½	.02¾	.05⅝
Herring, Coast, tks	gal.	.32½	Nom.	.23	.32½	.15	.23
Lard Oil, edible, prime	lb.	...	.16¾	.09¾	.17	..	.09¾
Extra, bbls	lb.	...	.11¾	.08½	.11¾	.07	.08½
Extra, No. 1, bbls	lb.	...	.11	.08¼	.11	.06⅜	.08¼
Linseed, Raw, less than 5 bbl lots	lb.	...	.105	.095	.105	.101	.105
bbls, c-l spot	lb.	...	.097	.087	.097	.087	.101
Tks	lb.	...	.091	.081	.091	.081	.095
Menhaden, tks, Baltimore	gal.	.28	.30	.25	.35	.15	.25
Refined, alkali, drs	lb.	...	.073	.061	.075	.052	.069
Tks	lb.	...	.067	.055	.069	.046	.061
Light pressed, drs	lb.	...	.067	.055	.069	.046	.057
Tks	lb.	...	.061	.049	.063	.04	.05
Neatsfoot, CT, 20° bbls, NY	lb.	...	.16¾	.16¼	.16½	...	.16½
Extra, bbls, NY	lb.	...	.11¼	.08½	.11¼	.07	.08½
Pure, bbls, NY	lb.	...	.11¾	.11¾	.12	.12	.13
Oleo, No. 1, bbls, NY	lb.	...	.13	.10¾	.14½	.06	.11½
No. 2, bbls, NY	lb.	...	.12¼	.10	.13¾	.05⅜	.11¼
Olive, denat, bbls, NY	gal.	.82	.83	.82	.95	.76	.90
Edible, bbls, NY	gal.	1.65	1.80	1.55	1.80	1.55	1.90
Foots, bbls, NY	lb.	.08¼	.08⅜	.07⅛	.08¾	.06½	.07½
Oiticica, bbls	lb.	.14½	.15	...	...	...	...
Palm, Kernel, casks	lb.	.047	Nom.	.03	.05¾	.02½	.04¼
Niger, cks	lb.	.04½	.04¾	.034	.05¾	.031	.03¾
Peanut, crude, bbls, NY	lb.	...	.10½	.10½	.10¾	.06½	.10¼
Refined, bbls, NY	lb.	...	.13	.12½	.14	.07½	.12½
Perilla, drs, NY	lb.	.08	.08¼	.07¾	.08¾	.08¼	.09⅝
Tks, Coast	lb.	.076	.078	.07¼	.08¼	.07½	.09
Pine, see Pine Oil, Chemical Section.							
Rapeseed, blown, bbls, NY	lb.	.085	.087	.08	.09	.08	.082
Denatured, drs, NY	gal.	.45	.46	.40	.53	.37	.44
Red, Distilled, bbls	lb.	.09⅛	.10⅛	.07⅜	.10⅛	.06⅞	.08⅜
Tks	lb.	...	.08¼	.06½	.08¼	.06	.06½
Salmon, Coast, 8000 gal tks	gal.	.35	Nom.	.25	.35	.15	.21
Sardine, Pac Coast, tks	gal.	...	.37	.24½	.37	.13	.25
Refined alkali, drs	lb.	.073	.077	.065	.079	...	...
Tks	lb.	...	.067	.06	.069	...	...
Light pressed, drs	lb.	.067	.071	.055	.073	...	...
Tks	lb.	...	.061	.049	.063	...	...
Sesame, yellow, dom	lb.	.13	.13½	.12¼	.13¾	.07½	.13¼
White, dos	lb.	.13	.13½	.12¾	.13¾	.08	.13¼
Soy Bean, crude							
Dom, tks, f.o.b. mills	lb.	...	.095	.08	.10	.06	.08
Crude, drs, NY	lb.	.101	.10½	.086	.11	.066	.09
Refd, bbls, NY	lb.	.106	.115	.091	.115	.071	.102
Tks	lb.	.10	.10½	.08	.10½	...	...
Sperm, 38° CT, bleached, bbls NY	lb.	.099	.101	.099	.101	.106	.11
45° CT, bleached, bbls, NY	lb.	.092	.094	.092	.094	.099	.103
Stearic Acid, double pressed dist bgs	lb.	.11¼	.12¼	.10	.12¼	.09	.11
Double pressed saponified bags	lb.	.11¾	.12¾	.09	.12¾	.09	.10
Triple pressed dist bgs	lb.	.14	.15	.12¾	.15¼	.11¾	.13¾
Stearine, Oleo, bbls	lb.	.09½	.09¾	.09¼	.12½	.05	.10⅝
Tallow City, extra loose	lb.	...	.07⅛	.05⅜	.07	.07⅛	.05⅜
Edible, tierces	lb.	...	.08½	.07¼	.08½	.04¾	.07¼
Acidless, tks, NY	lb.	...	.10	.07½	.10¾	.06	.07½
Turkey Red, single, bbls	lb.	.07½	.08	.07½	.08	.07½	...
Double, bbls	lb.	.12½	.13	.12½	.13	.12½	.13
Whale, crude, coast, tks	lb.	...	.04	...	.04	...	...
Winter bleach, bbls, NY	lb.	.081	.083	.07	.083	...	.072
Refined, nat, bbls, NY	lb.	.077	.083	.064	.081	.064	.07

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"We"—Editorially Speaking

Our literary editor notes, with more than passing interest, the publication of a novel, "The Axe Thrower of the Tittabawassee," on the banks of which famous stream stands the plant of the Dow Chemical Company. Judging by the title that this was the autobiography of one of his dear chemical friends, John Chew ordered a dozen copies for discreet circulation throughout consuming circles, only to discover with dismay that it is a thrilling story of the lumber days of Michigan, without even so much as a casual reference to epsom salts or carbon tetrachloride.

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We quote from that sprightly house-organ, *Retorts*, published by the Rolls Chemical Company, of Buffalo: "Again we burn incense before the altar of the gods, in the hope that April 1st was a red-letter day for the distillers and rehandlers of all grades of industrial alcohol. Conditions during the past year, particularly the past winter season, have been chaotic. The distiller with a large production has sold close to his cost. The wholesaler, in his desire to get every possible gallon, has sold close to his cost and has increased his accounts receivable far and beyond the border of safety. The gas stations, garages and service stations have likewise used alcohol as a lead to draw the motorist to their particular brand of gasoline and oil. So, as the accounts are being totalled up, no one seems to have made any money and there has been, as usual, an abnormal demand for red ink. April 1st apparently is the beginning of happy days, for new prices go into effect and all old contracts are complete with the closing of the first quarter of the year." We heartily second this motion—may we add to it hearty congratulations to the Rolls organization upon celebrating their twentieth anniversary. Like the very thoroughly married man, a chemical distributor may, these days, well retort: "twenty years isn't so long—it just seems so long."

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"We" should hate to think that Elon H. Hooker is as "hard boiled" as he looks in the last issue of *Fortune*.

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It may very well be, as *"Chem. & Met."* says editorially, that the dean of all American chemical historians, Dr. E. A. Brown, "dreamed" of a tercentenary celebration of the achievement of John Winthrop, the Younger. Nevertheless, the idea of that celebration was born right in our own office, and the suggestion made by our own Williams Haynes. The New York Committee came asking how the big entertainment fund could be raised, and he suggested that, having glorified the American chemist in Chicago, it was proper to glorify the chemical industrialist in New York, and that the three hundredth anniversary of John Winthrop's pioneer plant was a fitting occasion for that celebration.

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Always thoughtful of our readers' comfort, we have in hand for the next two months' issues, some particularly refreshing summer reading, and we promise you real treats. Watch with care for articles entitled: "Playing Poker with Patents" and "Diogenes in Half a Barrel."

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The Mathieson Alkali Works run a model dairy on the land over their salt deposits in Western New York State, and their vigorous and versatile president has complained bitterly that, as a chemical manufacturer, he is not taken seriously in the dairy industry, while among chemical executives he is accused of being a "big butter and egg man." Be that as it may, he has the happy faculty of delivering "Messages to Garcia," and an abstract of what he said at the Purchasing Agents Convention last month (turn to page 536) is worth reading.

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Did you know—

That on the 28th of July, 1914, the Dow Chemical Company sold ten tons of imported potassium chloride, which they had purchased for experimental purposes, to the American Agricultural Chemical Co. for $28 a ton? August 4 England declared war on Germany. August 16 Dow offered A. A. C. $100 a ton for this same material—and did not get it!

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From our own "I-told-you-so-department"; a quotation from an editorial in CHEMICAL INDUSTRIES one year ago, June, 1934: "We know that labor needs protection against sweating and child work and that it should have the security afforded by unemployment and old age insurance; but we fail to find a consistent program to these ends in Mr. Roosevelt's labor policy. We do find, however, much encouragement of two ideas, thoroughly and disastrously tried out in England and Germany; namely, wage fixing by law and compulsory arbitration of disputes before bureaucratic boards. Far from displaying wisdom and foresight, the President's policy has intensified the labor difficulties surrounding any recovery. If continued they will inject labor issues into politics, an outcome to be feared and hated by all citizens."

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"We" are grateful for the opportunity created by our quasi public position which has enabled us to help maybe half a hundred good men to find good jobs during the past five years; but we have wondered a little cynically at the ingratitude of most of those who have not even had the grace to drop us a postal card. Last month, however, "We" were greatly shocked by the arrival of three bottles of capital white wine and two bottles of cordials; the extremely tangible evidence of the gratitude of one man who claims that "We" helped him secure—not a job but a position, and our only fear is that on two different counts he has gotten us into bad habits.

A Correction

The Index of Chemicals in the Tercentenary Supplement carried a distinctly misleading heading which implied that what was really an index of products of the firms written up in the Supplement was a full list of chemicals made in the United States and their makers. Such an impression is obviously unfair to many good American chemical manufacturers, and we are glad that we were able to correct this heading during the latter half of the printing run. We want to apologize sincerely for the unintentional deception.